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United States
Department of
Agriculture

Cooperative State
Research Service

8

Food and Agriculture Competitively Awarded Research and Education Grants

Fiscal Year 1986

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FOOD AND AGRICULTURE
COMPETITIVELY AWARDED
RESEARCH AND EDUCATION GRANTS
FISCAL YEAR 1986

UNITED STATES
DEPARTMENT OF
AGRICULTURE

PREPARED BY THE OFFICE OF GRANTS
AND PROGRAM SYSTEMS, COOPERATIVE
STATE RESEARCH SERVICE

FEBRUARY 1987

FOREWORD

Agricultural research has benefited from a State-Federal partnership for nearly 100 years. This research system has kept agricultural production in a premier position in this country almost to the point of taking it for granted. This agricultural system has been envied and successfully emulated by others around the globe. The future of agriculture nationally and internationally depends upon dedicated scientists continually adding to the base of knowledge to sustain agriculture.

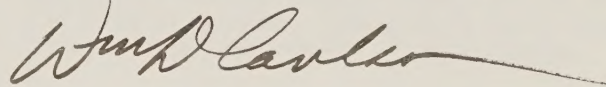
The grants reported in this publication represent still another aspect of this research system--the Competitive, Special, Forest and Rangeland Renewable Resources, Rangeland, and, Small Business Innovation Research Grants Programs as well as the Food and Agricultural Sciences National Needs Graduate Fellowships Grants Program. Collectively, the focus is primarily on basic research or education to discover the information needed before further important and necessary breakthroughs can be made in applied research programs.

Qualified scientists both inside and outside the traditional agricultural research system apply for and receive these grants. Thus, not only scientists from Federal laboratories, State agricultural experiment stations, schools of forestry, the 1890 institutions and Tuskegee University, and colleges of veterinary medicine participate in these programs, but also qualified scientists from various other organizations, both public and private.

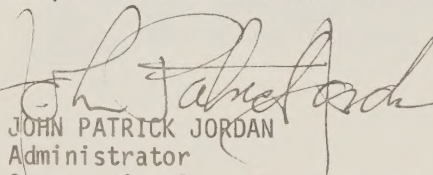
The primary aim of the mission-oriented basic research programs of CSRS is discovering new information needed to progress in biotechnology, animal sciences, insect sciences, and plant sciences. Other areas supported by grant programs include animal health, aquaculture, soybean, and alcohol fuels research as well as areas of the food and agricultural sciences suitable for graduate work and small business participation.

During fiscal year 1986, 635 competitive grants totaling \$58,735,222 were awarded.

It is our belief that out of this combination of a sound, stable, ongoing research system with a viable extramural grants program to attack significant and difficult problems in agricultural science comes the basic information and knowledge necessary to keep U.S. agriculture strong and resilient--ready and able to meet any challenge that might be ahead.



WILLIAM D. CARLSON
Acting Associate Administrator
Office of Grants and Program Systems
Cooperative State Research Service



JOHN PATRICK JORDAN
Administrator
Cooperative State Research Service

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This publication was prepared by the Grants
Administrative Management Staff, Office of Grants
and Program Systems, Cooperative State Research
Service, U.S. Department of Agriculture.

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and Distribution Section, Information Staff, Room
3431 South Building, Extension Service, U.S.
Department of Agriculture, Washington, D.C. 20250-
0900.

FOOD AND AGRICULTURE
COMPETITIVELY AWARDED RESEARCH AND EDUCATION GRANTS
FISCAL YEAR 1986

THE GRANTS PROGRAMS

The research grants programs of science and education under which the competitive selection process was used during fiscal year 1986 were the following:

1. Competitive Research Grants Program to support basic research in the food and agricultural sciences;

2. Special Research Grants Program to support research deemed by Congress and the Department of Agriculture to be of particular importance to the Nation;

3. Forest and Rangeland Renewable Resources Program to support basic research in the areas of harvesting, wood utilization, and forest biology.

These sources of funding supplement and complement funding of Federal agricultural research and the basic State research institution formula funding by Congress to help maintain a viable, effective, ongoing State-Federal agricultural research capability for this country.

In addition, grants were awarded competitively under the following programs:

4. Rangeland Research Grants Program to support basic research in certain areas of rangeland research.

5. Small Business Innovation Research Program, a primary aim of which is to stimulate technological innovation in the private sector.

Renewals were awarded for the support of fellows selected competitively under the Food and Agricultural Sciences National Needs Graduate Fellowships Grants Program, which is helping to develop professional and scientific expertise in the food and agricultural sciences.

Grant funds for all of the above programs are administered through the Office of Grants and Program Systems in the Cooperative State Research Service.

Guidelines for grants to be awarded competitively are published annually in the Federal Register, usually near the end of each calendar year. The guidelines identify selected research areas, anticipated funding levels, and requirements for the submission of proposals.

Single copies or annual or semiannual subscriptions for the Federal Register are available for a small charge from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

If you want further information on programmatic aspects of these grants, contact:

Dr. William D. Carlson
Acting Associate Administrator
Office of Grants and Program Systems
Cooperative State Research Service
U.S. Department of Agriculture
14th and Independence Avenue, S.W.
Washington, D.C. 20250-2200

If you want information on administrative aspects of these grants, contact:

Mr. Terry J. Pacovsky
Chief
Grants Administrative Management
Office of Grants and Program Systems
Cooperative State Research Service
U.S. Department of Agriculture
15th and Independence Avenue, S.W.
Washington, D.C. 20251-2200

The following are listings of awards (arranged by program areas) for fiscal year 1986. Please note that some of these awards are renewals/amendments to existing projects and are identifiable by agreement periods starting prior to October 1, 1984.

COMPETITIVE RESEARCH GRANTS PROGRAM

The following tabulation lists the funds awarded in the various areas in fiscal year 1986 under the Competitive Research Grants Program.

Plant Science	\$11,488,812
Biological Nitrogen Fixation	\$2,100,000
Biological Stress on Plants	3,950,000
Genetic Mechanisms for Crop Improvement	3,438,812
Photosynthesis	2,000,000
Human Requirements for Nutrients	\$ 2,253,396
Biotechnology	\$18,027,168
Plant Molecular Biology	4,987,028
Animal Molecular Biology	4,014,140
Animal Growth and Development	2,600,000
Plant Growth and Development	2,025,000
Responses to Environmental Stress in Plants	1,800,000
Plant Response to Biological Stress	2,601,000
Animal Science	\$4,056,492
Insect Pest Science	\$2,704,644
Acid Precipitation	\$ 626,628
Alcohol Fuels Research	\$ 487,272
Soybean Research	\$ 467,364
TOTAL	\$40,111,776

This program is administered under the authority of Section 2(b) of P.L. 89-106, 7 U.S.C. 450i(b), as amended by Section 1414(b) of P.L. 95-113 and Section 1415(a) of P.L. 97-98, and in accordance with Sections 6301-6308 of P.L. 97-258. Section 1419 of P.L. 95-113, as amended, authorized grants for the Alcohol Fuels Research Program.

U.S. colleges and universities, other research institutions, Federal agencies, private organizations or corporations, and individuals may submit proposals.

Plant Science

Grants were awarded in four areas of research in plant biology: Biological nitrogen fixation, biological stress on plants, genetic mechanisms for crop improvement, and photosynthesis. A brief description of each area of research, with a listing of research grants made during fiscal year 1986, follows.

Biological Nitrogen Fixation

Grants in this area support research to find ways to naturally increase the nitrogen available to plants. Lack of nitrogen for plant growth is the most common limiting factor in crop agriculture. This research will contribute to understanding nitrogen-fixing mechanisms in both symbiotic and free-living organisms, as well as the fate of fixed nitrogen.

The objective of this research is to build a foundation of basic information concerning nitrogen fixation. This information should help in the enhancement of the process in currently known systems and provide a base for developing new nitrogen-fixing associations, by genetic transfer or other means, for crop species not now posing such capability.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Arizona Tucson, AZ 85721	J. H. Enemark	84-CRCR-1-1416 8601279	\$120,000	09/01/84 08/31/88	95 Mo NMR as a Probe of Molybdenum Centers
Univ. of California Berkeley, CA 94720	John B. Neilands	85-CRCR-1-1633 8602311	\$50,000	09/01/85 08/31/87	Iron Assimilation in Symbiotic Nitrogen-fixing Microorganisms
Univ. of California Davis, CA 95616	John L. Ingraham	86-CRCR-1-2080 8601274	\$110,000	08/01/86 07/31/88	Studies on Denitrification
Univ. of California Irvine, CA 92717	Barbara K. Burgess	85-CRCR-1-1635 8602310	\$70,000	08/01/85 07/31/87	Substrate Reactions of Nitrogenase
Univ. of Chicago 5801 South Ellis Ave. Chicago, IL 60637	Robert Haselkorn	85-CRCR-1-1636 8603057	\$75,000	07/01/85 06/30/87	Rearrangement of Nitrogen Fixation Genes in Cyanobacterial Heterocyst Differentiation
Kansas State Univ. Manhattan, KS 66506	Peter P. Wong	86-CRCR-1-2116 8601371	\$85,000	08/15/86 08/31/88	Characterization of Proteins that are Found in Incompatible Bean (<u>Phaseolus vulgaris</u> L.) Nodules

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Massachusetts General Hospital Boston, MA 02114	Frederick Ausubel	86-CRCR-1-2043 8602564	\$5,000	07/01/86 09/30/86	3rd International Symposium on Plant-Microbe Interactions
Northeastern Univ. Boston, MA 02115	Kostia Bergman	86-CRCR-1-2117 8601461	\$50,000	08/01/86 07/31/87	Physiology and Genetics of Chemotaxis in <u>Rhizobium meliloti</u>
Johns Hopkins Univ. Baltimore, MD 21218	Robert J. Maier	84-CRCR-1-1406 8601197	\$90,000	07/15/84 07/31/88	Physiology and Genetics of Hydrogen Oxidation in <u>Rhizobium japonicum</u>
Beltsville Area ARS, USDA Beltsville, MD 20705	Perry B. Cregan	86-CRCR-1-2029 8601398	\$115,000	09/01/86 08/31/88	Genetic Interactions of Rhizobia and Soybean Affecting Nodulation and Competition
Michigan State Univ. East Lansing, MI 48824	Barry K. Chelm	85-CRCR-1-1739 8602877	60,000	08/15/85 08/31/87	Developmental and Physiological Gene Regulation in the <u>Rhizobium/Legume Symbiosis</u>
Michigan State Univ. East Lansing, MI 48824	Eldor A. Paul	84-CRCR-1-1525 8601368	\$85,000	12/01/85 11/30/88	The Control of Symbiotic N ₂ Fixation by Carbon-Phosphorus Interactions

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Michigan State Univ. East Lansing, MI 48824	John L. Wang	86-CRCR-1-2042 8601346	\$90,000	09/01/86 08/31/88	Lectin Receptors and Cytoskeletal Proteins in Soybean Cells
Univ. of Minnesota St. Paul, MN 55104	Alan B. Hooper	86-CRCR-1-2044 8601240	\$115,000	09/01/86 08/31/88	Mechanisms of N-Transformation in Nitrifying Bacteria
Washington Univ. St. Louis, MO 63130	Karel R. Schubert	86-CRCR-1-2108 8601545	\$100,000	09/01/86 08/31/88	Cellular Location and Regulation of Enzymes of N Assimilation in Soybean Nodules
North Carolina State Univ. Raleigh, NC 27695	Stephanie E. Curtis	86-CRCR-1-2245 8601243	\$80,000	09/15/86 09/30/88	Induction of Gene Expression During Heterocyst Development
Agricultural Expt. Stn. Univ. of Nebraska Lincoln, NE 68583-0204	Robert V. Klucas	84-CRCR-1-1427 8601214	\$86,400	08/01/84 07/31/88	Factors Affecting Functional Leghemoglobin in Legume Nodules
Boyce Thompson Institute for Plant Research Cornell Univ. Ithaca, NY 14853	Thomas A. LaRue	86-CRCR-1-2060 8601280	\$78,600	08/01/86 07/31/89	Mapping the Symbiosis Genes of Pea

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Battelle-Kettering Research Lab 150 E. South College St. Yellow Springs, OH 45387	Gerald A. Peters	86-CRCR-1-2146 8601330	\$130,000	09/15/86 09/30/88	Azolla-Anabaena Symbiosis: Probing Sporocarp to Sporophyte Development
Battelle-Kettering Research Lab 150 E. South College St. Yellow Springs, OH 45387	Gerald D. Watt	84-CRCR-1-1509 8601331	\$110,000	09/01/84 08/31/88	The Mechanism and Energetics of Biological Nitrogen Fixation
Ohio State Univ. Columbus, OH 43212-1194	Wolfgang D. Bauer	86-CRCR-1-2118 8601313	\$47,000	09/15/86 09/30/87	Mechanisms Regulating Nodule Formation in Soybean
Oregon State Univ. Corvallis, OR 97331	Peter J. Bottomley	85-CRCR-1-1704 8602374	\$63,000	08/01/85 07/31/87	Factors Influencing Competition Between Members of Indigenous Populations of <u>R. trifolii</u>
Univ. of Tennessee Knoxville, TN 37996	Gary Stacey	86-CRCR-1-2120 8601184	\$20,000*	09/01/86 08/31/88	Genetic Regulation of the Nodulation Genes of <u>Bradyrhizobium japonicum</u>
Univ. of Virginia Charlottesville, VA 22901	Bruce A. Averill	36-CRCR-1-2033 8601277	\$95,000	08/01/86 07/31/88	Models for the Metal Cofactors of Nitrogenase: Potential N ₂ Fixation Catalysts

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Washington State Univ. Pullman, WA 99164	Michael L. Kahn	86-CRCR-1-2119 8601281	\$120,000	08/15/86 08/31/88	Amino Acid Metabolism and the <u>Rhizobium</u> -Legume Symbiosis
Univ. of Wisconsin Madison, WI 53706	Jerald Ensign	84-CRCR-1-1408 8601341	\$50,000	09/01/84 08/31/87	Vesicle Function and Developing a Genetic Transformation in <u>Frankia</u>

TOTAL \$2,100,000

* Split Funded with Biotechnology-Plant Molecular Biology/Nitrogen Fixation for a total award amount of \$95,000

Biological Stress on Plants

Research grants in this area support studies on stresses on plants arising from their interactions with other plants or with other biological agents such as weeds, insects, nematodes, fungi, bacteria, viruses and mycoplasma-like organisms. The ultimate goal is to reduce losses in plant productivity from damage caused by biologically generated stresses.

Emphasis in this area is on studies that will enhance understanding of how stressful interactions are established between plants and other biological agents; how such interactions are influenced by environmental and other factors inherent to the interacting organisms; how the interactions reduce plant productivity and usefulness to man; how plants react to stress generated by such interactions; and how damage from such interactions may be reduced or eliminated.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS-ENTOMOLOGY & NEMATOTOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Northern Arizona Univ. Flagstaff, AZ 86011	Thomas G. Whitham	84-CRCR-1-1443 8602658	\$40,000	07/15/84 07/31/87	The Interaction of Environmental Stress and Herbivory on Pinyon Pine, <u>Pinus edulis</u>
Univ. of California Davis, CA 95616	Sean S. Duffey	86-CRCR-1-1993 8600119	75,000	07/01/86 06/30/88	Biochemical Facets of Antibiosis of Tomatoes against Noctuid Larvae
Univ. of California Riverside, CA 92521	E. G. Platzer	85-CRCR-1-1629 8603116	\$50,000	09/01/85 08/31/87	Molecular Diagnostics of Plant Parasitic Nematodes
Univ. of Florida Gainesville, FL 32611	D. W. Dickson	86-CRCR-1-1971 8600393	\$75,000	09/01/86 08/31/88	Biological Investigations of Nematode Stress on Corn Yield
Univ. of Hawaii Honolulu, HI 96822	Kenneth Kaneshiro	86-CRCR-1-1952 8600216	\$75,000	07/01/86 06/30/88	Behavioral Biology of the Medfly for Improving the Effectiveness of Control Programs
Univ. of Illinois Urbana, IL 61801	Marcos Kogan	86-CRCR-1-2174 8600081	\$95,000	09/01/86 08/31/89	Effects of Soybean Phytoalexins on Herbivorous Insects

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS-ENTOMOLOGY & NEMATOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Kansas Lawrence, KS 66045	William J. Bell	86-CRCR-1-1972 8600173	\$75,000	07/01/86 06/30/88	Discrimination of Food Plant Patches by Pest Insects
Louisiana State Univ. & A&M College Baton Rouge, LA 70803	Dorothy P. Pashley	86-CRCR-1-2027 8603162	\$10,000*	07/01/86 06/30/88	Characterization of Host Races or Sibling Species in Fall Armyworm
Univ. of Massachusetts Amherst, MA 01003	Ronald J. Prokopy	86-CRCR-1-2006 8600154	90,000	08/01/86 07/31/88	Effect of Adult Conditioning on Host Selection in Apple Maggot and Mediterranean Fruit Flies
Univ. of Massachusetts Amherst, MA 01003	Ronald J. Prokopy	86-CRCR-1-2006 8603158	\$10,000	08/01/86 07/31/88	Effect of Adult Conditioning on Host Selection in Apple Maggot and Mediterranean Fruit Flies
Univ. of Maryland, Baltimore County Catonsville, MD 21228	Frank E. Hanson	86-CRCR-1-2031 8600487	\$75,000	07/01/86 06/30/88	Physiological Basis of Feeding Deterrence by Phytophagous Insects
Michigan State Univ. East Lansing, MI 48824	Guy L. Bush	84-CRCR-1-1398 8600458	\$90,000	06/15/84 06/30/88	The Genetics of Host Selection in <u>Rhagoletis</u> Fruit Flies

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS-ENTOMOLOGY & NEMATOTOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Michigan State Univ. East Lansing, MI 48824	James R. Miller	86-C R C R-1-2026 8600608	\$85,000	07/01/86 06/30/88	Cull Onions as Trap Crop for Onion Maggot
Michigan State Univ. East Lansing, MI 48824	James R. Miller	86-C R C R-1-2026 8603161	\$10,000	07/01/86 06/30/88	Cull Onions as Trap Crops for Onion Maggot
Univ. of Missouri 8001 Natural Bridge Rd. St. Louis, MO 63121	Robert I. Bolla	86-C R C R-1-1984 8600189	\$75,000	09/01/86 08/31/88	<u>Bursaphelenchus xylophilus</u> Pinewilt: Pathotypes and Stress Chemical Response
North Carolina State Univ. Raleigh, NC 27695-7003	George G. Kennedy	85-C R C R-1-1615 8602285	\$50,000	07/01/85 06/30/87	Mechanisms of Multiple Insect Resistance in Wild Tomato Species
Univ. of Nebraska Lincoln, NE 68588-0430	Anthony Joern	86-C R C R-1-1974 8600321	\$83,000	08/01/86 07/31/88	Reciprocal Relations Between Rangeland Grasses and Grasshoppers
Univ. of Nevada Reno, NV 89557	Ronald S. Pardini	86-C R C R-1-2038 8600453	\$75,000	07/01/86 06/30/88	Insect Adaptations to Plant Pro- oxidants

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS-ENTOMOLOGY & NEMATOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Nevada Reno, NV 89557-0025	Gary Blomquist	85-CRCR-1-1630 8603054	\$50,000	07/01/85 06/30/87	Biosynthesis of Insect Hydrocarbons-Potential for Insect Control
Boyce Thompson Inst. for Plant Research Cornell Univ. Tower Road Ithaca, NY 14853	J. Alan A. Renwick	86-CRCR-1-2007 8600044	\$75,000	08/01/86 07/31/88	Plant Constituents Deterring Oviposition by Cabbage Butterflies
Boyce Thompson Inst. for Plant Research Cornell Univ. Tower Road Ithaca, NY 14853	Patrick R. Hughes	84-CRCR-1-1387 8603031	\$40,000	09/01/84 08/31/87	Quantitation of Viral Pesticide Infectivity and Pathogenicity
Boyce Thompson Institute for Plant Research Cornell Univ. Tower Road Ithaca, NY 14853	H. A. Wood	86-CRCR-1-2011 8600045	\$23,000	09/01/86 08/31/88	Persistent Baculovirus Infections of Insects
Boyce Thompson Institute for Plant Research Cornell Univ. Tower Road Ithaca, NY 14853	Robert R. Granados	86-CRCR-1-1950 8600350	\$75,000	09/01/86 08/31/88	Replication and Gene Expression of <u>Trichoplusia ni</u> Granulosis Virus in Cell Culture
Cornell Univ. Ithaca, NY 14853	Ward M. Tingey	86-CRCR-1-1992 8600178	\$85,000	09/15/86 09/30/88	Plant Glandular Trichomes: A Mechanism for Combatting Insect Stress

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS-ENTOMOLOGY & NEMATOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Ohio State Univ. Res. Fdn. Columbus, OH 43212	R. M. Riedel	86-CRCR-1-2000 8600204	\$75,000	09/01/86 08/31/88	Root Lesion Nematode/Verticillium Interactions in Potato Early Dying Disease
Ohio State Univ. Res. Fdn. Columbus, OH 43212	Lowell R. Nault	84-CRCR-1-1370 8602380	\$65,000	06/15/84 06/30/87	Evolution of Leafhoppers and Stunting Pathogens with Maize and its Ancestors
Ohio State Univ. Res. Fdn. Columbus, OH 43212	David L. Denlinger	86-CRCR-1-2049 8600186	\$85,000	09/01/86 08/31/88	Control of Insect Populations by Regulation of Dormancy
Gordon Research Conferences Gordon Research Center Univ. of Rhode Island Kingston, RI 02881	A. Cruickshank	86-CRCR-1-1920 8600003	\$7,000	01/15/86 07/31/86	Gordon Research Conference on Plant-Herbivore Interactions
Texas A & M Res. Fdn. College Station, TX 77843	Timothy K. Hayes	86-CRCR-1-2008 8600333	\$75,000	09/01/86 08/31/88	Insect Hypertrehalosemic Neurohormone: Molecular Pharmacology
Washington State Univ. Pullman, WA 99164	John Thompson	84-CRCR-1-1395 8600187	\$82,000	06/15/84 05/31/88	Genetics and Expression of Oviposition Preference in Oligophagous and Monophagous Insects

TOTAL \$1,875,000

* Split Funded with Biotechnology-Response to Biological Stress Plant Entomology for
a total awarded amount of \$90,000

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS-PLANT PATHOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Arizona Tucson, AZ 85721	Alan J. Howarth	85-CRCR-1-1793 8601815	\$80,000	09/01/85 08/31/88	Gene Expression of a Geminivirus
Univ. of California Davis, CA 95616	George E. Breuning	84-CRCR-1-1449 8603115	\$50,000	09/15/84 09/30/87	Antiviral Action of Satellite RNA
Univ. of California Davis, CA 95616	John M. Duniway	85-CRCR-1-1580 8602293	\$50,000	07/01/85 06/30/87	Influence of Environmental Stresses on the Development and Impact of Phytophthora Root Rot
Univ. of California Los Angeles, CA 90024	Charles A. West	86-CRCR-1-2145 8600520	\$100,000	09/01/86 08/31/88	The Role of Transcription During Elicitation by Pectic Cell Wall Fragments
Univ. of California Riverside, CA 92521	J. Allan Dodds	86-CRCR-1-2205 8601659	\$90,000	09/01/86 08/31/88	Satellite Tobacco Mosaic Virus
Univ. of California Riverside, CA 92521	Jodie S. Holt	86-CRCR-1-1931 8600203	\$57,556	09/01/86 08/31/88	The Relationship of Triazine Resistance to Decreased Plant Productivity

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS-PLANT PATHOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Georgia Res. Fdn., Inc. Athens, GA 30602	William Timberlake	86-CRCR-1-1529 8603030	\$50,000	09/15/86 09/30/87	Development of Molecular Cloning Vectors for Filamentous Fungi
Univ. of Hawaii Honolulu, HI 96822	S. S. Patil	86-CRCR-1-2260 8601831	\$80,000	09/15/86 09/30/88	Molecular Biology of Papaya Anthracnose
Univ. of Illinois Urbana, IL 61801	Paul D. Shaw	86-CRCR-1-2237 8601691	\$80,000	09/15/86 09/30/88	Characterization of Virulence Genes from <u>Pseudomonas syringae</u> pv. <u>tabaci</u>
Univ. of Illinois Urbana, IL 61801	Stephen K. Farrand	84-CRCR-1-1528 8602383	\$50,000	07/15/86 11/30/87	Crown Gall Control: Plasmid Engineering to Maximize Control and Minimize Failure
Kansas State Univ. Manhattan, KS 66506	Steven A. Lommel	86-CRCR-1-2253 8601822	\$9,000*	09/15/86 09/30/88	Genetic Organization of Red Clover Necrotic Mosaic Virus
Kansas State Univ. Manhattan, KS 66506	William F. Pfender	86-CRCR-1-2206 8601690	\$90,000	09/15/86 09/30/88	Microbial Antagonism to the Wheat Tanspot Pathogen in Conservation Tillage Straw

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS-PLANT PATHOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Kentucky Res. Fdn. Lexington, KY 40506	John G. Shaw	85-CRCR-1-1536 8603120	\$45,000	07/01/85 06/30/87	Viral Gene Expression in Potyvirus Infections
Univ. of Kentucky Res. Fdn. Lexington, KY 40506	Robert J. Shepherd	86-CRCR-1-2261 8601734	\$50,000	09/15/86 09/30/87	Defining and Mapping the Genes of Cauliflower Mosaic Virus
Louisiana Agricultural Expt. Stn. Louisiana State Univ. & A&M College Baton Rouge, LA 70893	Marc A. Cohn	86-CRCR-1-1962 8600230	\$80,000	07/01/86 06/30/88	Physiological Mechanisms of Weed Seed Dormancy
Univ. of Maine Orono, ME 04469	Stellos M. Tavantzis	84-CRCR-1-1430 8602502	\$50,000	07/01/84 06/30/87	Biological Control by Transmissible Hypovirulence in <u>Rhizoctonia Solani</u>
Wayne State Univ. Detroit, MI 48202	Albert Siegel	86-CRCR-1-2223 8600160	\$80,000	09/01/86 08/31/88	A Model for the Origin and Nature of Viroids
Northern States Area ARS, USDA 220 2nd Street South, 1st Floor Minneapolis, MN 55401	Alan P. Roelfs	85-CRCR-1-1534 8603146	\$45,000	07/01/85 06/30/87	Genetic Diversity in Sexual and Asexual Populations of Rust Fungi in Agroecosystems

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS-PLANT PATHOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Missouri Columbia, MO 65211	Steven G. Pueppke	86-CRCR-1-2224 8601800	\$80,000	09/15/86 09/30/88	Studies on the Role of Binding in Susceptibility of Plants to Crown Gall
Washington Univ. St. Louis, MO 63130	Roger N. Beachy	86-CRCR-1-2262 8601749	\$50,000	09/15/86 09/30/87	Mechanism of Disease Resistance in Transgenic Plants
Mid-South Area ARS, USDA P.O. Box 225 Stoneville, MS 38776	Kevin C. Vaughn	86-CRCR-1-1933 8600596	78,870	06/01/86 05/31/88	A Dinitroaniline-resistant Eleusine Biotype with Altered Tubulin
Univ. of Nebraska Agric. Expt. Stn. Lincoln, NE 68583-0704	J. M. Daly	85-CRCR-1-1542 8603134	\$42,500	07/01/85 06/30/87	Identification of Host Components Determining Resistance or Susceptibility to Toxins
Cornell Univ. Ithaca, NY 14853	Christine Shoemaker	86-CRCR-1-1953 8600575	\$80,000	08/01/86 07/31/88	Apple Scab Management: Simulation, Optimization, and Field Validation
Cornell Univ. Ithaca, NY 14853	Steven V. Beer	86-CRCR-1-2225 8601821	\$100,000	09/15/86 09/30/88	Molecular Genetics of Pathogenicity of <u>Erwinia</u> <u>amylovora</u>

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS-PLANT PATHOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Cornell Univ. Ithaca, NY 14853	William E. Fry	86-CRCR-1-2226 8601834	\$57,074	09/01/86 08/31/88	The Genetics of <u>Phytophthora infestans</u>
Oregon State Univ. Corvallis, OR 97331	Janice A. Kimpel	86-CRCR-1-2266 8601763	\$50,000	09/15/86 09/30/88	The Effect of Heat on Resistance Responses in Soybean
Oregon State Univ. Corvallis, OR 97331	David E. Hibbs	84-CRCR-1-1434 8600497	\$80,000	09/01/84 08/31/88	Intra-and Interspecific Interference among Red Alder and Douglas-fir
Northwest Area ARS, USDA 809 NE Sixth Ave. Portland, OR 97232	Linda S. Thomashow	86-CRCR-1-1945 8600553	\$100,000	09/01/86 08/31/88	Mechanisms in the Biological Control of <u>Gaeumannomyces graminis</u> by <u>Pseudomonas</u> spp.
Univ. of Rhode Island Kingston, RI 02881	William R. Krul	86-CRCR-1-1949 8600544	\$80,000	09/01/86 08/31/88	Genetics, Physiology, and Molecular-Biology of Host-Pathogen Interaction
Washington State Univ. Pullman, WA 99164-6430	Dennis C. Gross	86-CRCR-1-2227 8601830	\$90,000	09/01/86 08/31/88	Molecular Genetics of Phytotoxin Production by <u>Pseudomonas syringae</u> pv. <u>syringae</u>

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOLOGICAL STRESS ON PLANTS-PLANT PATHOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Washington Seattle, WA 98195	Eugene W. Nester	84-CRCR-1-1438 8602538	\$50,000	08/01/84 07/31/87	Organization and Regulation of <u>LLL Genes of Agrobacterium</u>

TOTAL \$2,075,000

* Split Funded with Biotechnology-Response to Biological Stress Plant Pathology for
a total awarded amount of \$90,000

Genetic Mechanisms for Crop Improvement

Grants in this area are to encourage innovative or unique genetic approaches to the development of genetically superior varieties of agricultural crops. They are directed toward obtaining novel genetic combinations or gene modifications that cannot be achieved using conventional plant breeding techniques. Research areas are: acquisitions of basic information on the plant nuclear and organellar genes; development of cellular and molecular methods for identifying plant genes or traits which are important targets for genetic manipulation; development of molecular and cellular methods for crop improvement using gene transfer or genetic engineering technology; cell and tissue culture studies designed to increase our knowledge of the basic processes involved in regenerating whole plants from single cells; development of new methods for producing, selecting, and transferring agronomically important traits; and basic genetic studies on the alteration and utilization of unadapted and wild germplasm.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Auburn Univ. Auburn University, AL 36849	David M. Bisaro	84-CRCR-1-1381 8600322	\$60,000	09/01/84 08/31/87	Construction of a Plant Vector Derived from Geminivirus DNA
Univ. of Arizona Tucson, AZ 85721	Thomas J. McCoy	86-CRCR-1-2076 8603052	\$87,148	08/01/86 07/31/89	Synthesis of Novel Genomic Combinations in <u>Medicago</u>
Univ. of California Davis, CA 95616	Carlos F. Quiros	86-CRCR-1-1926 8600025	\$105,000	06/01/86 05/31/88	Genome Evolution in <u>Brassica</u>
Univ. of California Davis, CA 95616	Jan Dvorak	84-CRCR-1-1367 8600295	\$120,000	09/01/84 08/31/88	Transfer of a Complex Trait-Salt Tolerance-from <u>Elytrigia</u> to Wheat
Univ. of California Davis, CA 95616	John I. Yoder	86-CRCR-1-1991 8600016	\$115,000	09/01/86 08/31/88	Towards a Transposon-tagging System in Tomato
Univ. of California Davis, CA 95616	Raymond Rodriguez	86-CRCR-1-2231 8600199	\$41,681*	09/15/86 09/30/88	The Molecular Biology of the Rice-Alpha-amylase Genes

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Florida Gainesville, FL 32611	C. D. Chase	86-CRCR-1-1982 8600392	\$115,000	07/01/86 06/30/89	Molecular Genetics of Cytoplasmic Male Sterility in Common Bean, <u>Phaseolus vulgaris</u>
Univ. of Florida Gainesville, FL 32611	Daryl R. Pring	86-CRCR-1-2204 8601902	\$6,000	09/15/86 03/31/87	An International Higher Plant Mitochondrial DNA Workshop
Univ. of Florida Gainesville, FL 32611	Larkin C. Hannah	86-CRCR-1-2037 8600449	\$120,000	08/01/86 07/31/89	Molecular Characterization of t Sucrose Synthetase-2 Gene of Maize
Univ. of Florida Gainesville, FL 32611	Robert J. Ferl	86-CRCR-1-1997 8600345	\$240,000	09/01/86 08/31/89	Chromatin Structure and Gene Expression in Maize
Univ. of Florida Gainesville, FL 32611	Roy A. Jensen	86-CRCR-1-1944 8600337	\$120,000	06/01/86 05/31/88	Metabolic Impact of Glyphosate Upon <u>Nicotiana glauca</u>
Univ. of Florida Gainesville, FL 32611	F. G. Gmitter	86-CRCR-1-2002 8600388	\$114,432	07/01/86 06/30/89	In Vitro Derived Genetic Variability in <u>Citrus</u>
Florida State Univ. Tallahassee, FL 32306	Margaret Y. Menzel	86-CRCR-1-2184 8601723	\$175,000	09/15/86 12/31/89	Development of a Cytogenetic Manipulation System for Cotton

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
South Atlantic Area ARS, USDA PO Box 5677 Athens, GA 30613	C. W. Stuber	86-CRCR-1-2030 8601721	\$90,000	09/15/86 09/30/87	Dissection of Heterosis of Quantitative Traits Using Molecular Markers
Central Plains Area ARS, USDA P.O. Box 70 Ames, IA 50010	E. H. Coe, Jr.	86-CRCR-1-1941 8600087	\$126,000	06/01/86 05/31/89	Definition and Manipulation of Chromosome Segmental Effects in Corn
Iowa State Univ. of Science & Technology Ames, IA 50011	Reid G. Palmer	86-CRCR-1-2110 8601605	\$147,249	09/01/86 08/31/89	Use of Synaptic Mutants and Embryo Culture to Generate Aneuploids in Soybean
Univ. of Iowa Iowa City, IA 52242	Wayne R. Carlson	86-CRCR-1-2122 8601413	\$85,000	09/15/86 09/30/88	New Applications for B-A Translocations in Maize
Univ. of Illinois Urbana, IL 61801	John R. Laughnan	84-CRCR-1-1364 8601746	\$135,110	08/01/84 07/31/88	Insertion of Controlling Elements into <u>cms-S</u> Fertility Restorer Genes in Maize
Purdue Res. Fdn. West Lafayette, IN 47907	Jeffrey Bennetzen	86-CRCR-1-2121 8602199	\$210,000	08/15/86 08/31/89	Analysis of the Molecular Genetics of the <u>Mutator</u> Transposable Element System of Maize

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Kansas State Univ. Manhattan, KS 66506	Bikram S. Gill	86-CRCR-1-2222 8600092	\$100,000	09/15/86 09/30/89	Physical Mapping of the Genome of Wheat
Kansas State Univ. Manhattan, KS 66506	Rollin G. Sears	84-CRCR-1-1413 8603156	\$19,000	07/15/84 07/31/87	Chromosomal Mapping of Genes Controlling Tissue Culture Response in Wheat
Univ. of Minnesota St. Paul, MN 55104	Burle Gengenbach	86-CRCR-1-2019 8600106	\$140,000	07/01/86 06/30/89	Genetic and Enzymatic Regulation of Amino Acid Synthesis in Corn
Montana State Univ. Bozeman, MT 59717	Thomas L. Black	84-CRCR-1-1481 8600091	\$35,000	09/15/84 09/30/87	Use of Single Copy Cloned DNA Sequences as Genetic Markers in Barley
North Carolina State Univ. Raleigh, NC 27695	William Thompson	85-CRCR-1-1910 8603157	\$85,000	09/15/86 09/30/87	Isolation and Characterization of Genes Regulated by Light
North Dakota Agric. Expt. Stn. North Dakota State Univ. Fargo, ND 58105	S. S. Maan	86-CRCR-1-2160 8600317	\$74,192	08/15/86 08/31/88	Genetically Induced Chromosome Doubling in Germ Cells of Wheat

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of North Dakota Grand Forks, ND 58202	William F. Sheridan	86-CRCR-1-2079 8601841	\$120,000	07/01/86 06/30/89	Genetic Control of Plant Morphogenesis: Studies on Two Homeotic Mutants of Maize
Univ. of Nebraska Lincoln, NE 68588	John C. Osterman	84-CRCR-1-1479 8601747	\$100,000	09/01/84 08/31/88	Transposon of Maize Controlling Elements
Cold Spring Harbor Laboratory P.O. Box 100 Cold Spring Harbor, NY 11724	Stephen Dellaporta	86-CRCR-1-1927 8600174	\$6,000	05/01/86 10/31/86	Conference on Eukaryotic Transposable Elements
Univ. of Oregon Eugene, OR 97403	Howard T. Bonnett	86-CRCR-1-1985 8600589	\$100,000	07/01/86 06/30/88	Nuclear-cytoplasmic Inheritance Among the Solanaceae
Texas A&M Res. Fdn. College Station, TX 77843	J. F. Doebley	86-CRCR-1-2161 8600242	\$100,000	09/01/86 08/31/89	Isozyme Genetics of <u>Sorghum</u> <u>bicolor</u> and Related Species
Texas A&M Res. Fdn. College Station, TX 77843	David M. Stelly	86-CRCR-1-2129 8600412	\$100,000	09/15/86 09/30/89	Genetic Control of Semigamy; and Derivation of Nullisomic Cotton

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: GENETIC MECHANISMS FOR CROP IMPROVEMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Texas A&M Res. Fdn. College Station, TX 77843	Gary E. Hart	86-CRCR-1-2094 8601829	\$120,000	08/01/86 07/31/88	Chromosomal Locations of Wheat Genes that Hybridize to Unique- Sequence-DNA Clones
Univ. of Wisconsin Madison, WI 53706	Peter H. Quail	85-CRCR-1-1578 8603155	\$127,000	09/01/85 08/31/87	The Phytochrome Gene: Structure, Organization and Expression

TOTAL \$3,438,812

* Split Funded with Biotechnology-Plant Molecular Biology for a total awarded amount of \$120,000

Photosynthesis

Grants in this area focus on a better understanding of photosynthesis and associated carbon metabolism. Photosynthesis is the process that crop plants use to convert solar energy into food products that plants and animals use for growth and development.

The program's aim is to cover such areas as the mechanisms of energy capture and conversion, structure, synthesis, and turnover of the photosynthetic apparatus, CO₂ fixation, photorespiration, and dark respiration. Other areas included in this program are projects on the relation of plant development to photosynthesis, including development of photosynthetic competence, translocation and partitioning of photosynthetic products; and design of whole leaf and whole plant structures best suited for photosynthetic productivity. Another area set forth for proposals is the design of new methods of genetic and cellular manipulation to improve photosynthetic efficiency in plants--including studies of the chloroplast genome, of nuclear genes regulating photosynthesis, and analysis of regulatory steps controlling both nuclear and cytoplasmic genome expression and their interactions.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Arizona State Univ. Tempe, AZ 85287	Robert Blankenship	84-CRCR-1-1523 8600477	\$100,000	09/01/85 08/31/88	Reaction Center Structure and Function in Green Photosynthetic Bacteria
Univ. of Arizona Tucson, AZ 85721	Richard G. Jensen	86-CRCR-1-2083 8600579	\$93,000	08/01/86 07/31/88	Regulation of Photosynthetic CO ₂ Assimilation in Wheat and Maize
Univ. of California Davis, CA 95616	Theodore C. Hsiao	86-CRCR-1-2034 8600510	\$57,000	07/15/86 07/31/88	Canopy Photosynthesis: Relation to Stomata and to Water Use
Univ. of California Los Angeles, CA 90024	J. Philip Thornber	86-CRCR-1-2045 8600598	\$100,000	07/15/86 07/31/88	The Light-Harvesting Complex of Photosystem I (LHCI)
Univ. of Connecticut Storrs, CT 06268	Harry A. Frank	86-CRCR-1-2016 8600038	\$70,000	09/01/86 08/31/88	The Mechanism of Triplet Energy Transfer Between Photosynthetic Pigments
Univ. of Miami Coral Gables, FL 33124	Roger E. Fenna	85-CRCR-1-1573 8600423	\$80,000	09/01/85 08/31/88	Structural Studies of Chlorophyll Protein Complexes

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Florida Gainesville, FL 32611	George E. Bowes	86-CRCR-1-2109 8600545	90,000	09/01/86 08/31/88	C O ₂ Concentrating Mechanisms in Photosynthesis
Univ. of Florida Gainesville, FL 32611	Karen E. Koch	84-CRCR-1-1478 8600476	\$60,000	09/01/84 08/31/88	Phloem Unloading, Non-Vascular Transfer, and Sink Metabolism in Citrus Fruit
Univ. of Illinois Urbana, IL 61801	Colin A. Wraight	86-CRCR-1-2149 8600515	\$29,000*	09/15/86 09/30/88	Molecular Biochemistry of Herbicide Resistance
Univ. of Illinois Urbana, IL 61801	Archie R. Portis, Jr.	86-CRCR-1-2017 8600171	\$83,000	08/01/86 07/31/88	The Role of Thylakoid Membranes in Rubisco Activation
Univ. of Illinois Urbana, IL 61801	C. John Whitmarsh	86-CRCR-1-1987 8600519	\$85,000	09/01/86 08/31/88	Electron Transfer and Proton Translocation Mechanisms in Chloroplasts
Purdue Res. Fdn. West Lafayette, IN 47907	Richard A. Dilley	84-CRCR-1-1472 8600559	\$75,000	08/15/84 08/31/88	The Role of the 10 K Dalton Chloroplast Phosphoprotein in Photosynthesis

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Harvard College Cambridge, MA 02138	Lawrence Bogorad	85-CRCR-1-1584 8602876	\$60,000	09/01/85 08/31/87	Genes for Photosynthesis in Corn
Univ. of Michigan Ann Arbor, MI 48109	Charles F. Yocum	86-CRCR-1-2025 8600421	\$90,000	09/15/86 09/30/88	Biochemistry of Photosynthetic Oxygen Evolution
Michigan State Univ. East Lansing, MI 48824	C. R. Somerville	86-CRCR-1-2046 8600112	\$83,000	07/01/86 06/30/88	Genetic Modification of Photosynthesis and Photorespiration
Univ. of Missouri Columbia, MO 65211	Curtis J. Nelson	86-CRCR-1-1970 8600590	\$75,000	09/01/86 08/31/88	Role of Fructans in the Grass Leaf Meristem
Cornell Univ. Ithaca, NY 14853	Andre Jagendorf	85-CRCR-1-1587 8602312	\$55,000	09/15/85 09/30/87	Chloroplast Proteins: Synthesis, Degradation and Controls
Brookhaven National Laboratory U.S. Department of Energy Upton, NY 11973	John Bennett	84-CRCR-1-1487 8603121	\$60,000	09/01/84 08/31/87	Chloroplast Protein Kinases and the Regulation of Photosynthesis

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Dayton Dayton, OH 45469	Jerome C. Servaites	86-CRCR-1-2093 8600511	\$90,000	09/01/86 08/31/88	Interactions Between Carbon Fixation, Product Formation and Translocation
Brown Univ. Providence, RI 02912	Samuel I. Beale	86-CRCR-1-2047 8600554	\$80,000	07/01/86 06/30/88	Biosynthesis of Phycobilins
U.S. Dept. of Energy Oak Ridge Operations P.O. Box E Oak Ridge, TN 37831	Fred C. Hartman	84-CRCR-1-1520 8600442	\$105,000	09/15/84 09/30/88	Characterization of Phosphoribulokinase, a Regulatory Enzyme in Photosynthesis
Texas Tech Univ. Lubbock, TX 79409	David B. Knaff	85-CRCR-1-1574 8602309	\$60,000	09/01/85 08/31/87	Protein Complexes in Photosynthetic Electron Transfer Reactions
Washington State Univ. Pullman, WA 99164	Gerald E. Edwards	86-CRCR-1-2036 8600443	\$75,000	09/15/86 09/30/88	Isolation and Characterization of C4 Photosynthesis Mutants
Univ. of Wisconsin Madison, WI 53706	K. G. Keegstra	86-CRCR-1-2018 8600578	\$85,000	09/01/86 08/31/88	Energy Requirements for Protein Import into Chloroplast

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Medical College of Wisconsin, Inc. Milwaukee, WI 53226	Henry M. Miziorko	84-CRCR-1-1486 8600571	\$105,000	09/01/84 08/31/88	Regulated Enzymes in CO ₂ Fixation: Mechanisms of Activation and Catalysis
Univ. of Wyoming Laramie, WY 82071	Thomas Vogelmann	86-CRCR-1-2048 8600556	\$55,000	07/01/86 06/30/88	Light Regime Inside Leaves and Photosynthesis: Relationships to Leaf Anatomy and Morphology

TOTAL \$2,000,000

*Split Funded with Biotechnology-Plant Molecular Biology Photosynthesis for a total
awarded amount of \$100,000

HUMAN REQUIREMENTS FOR NUTRIENTS

The emphasis in this program area is on determining human requirements for nutrients. Support is not provided for clinical research or for demonstration or action projects.

Research in human nutrition contributes to improving human nutritional status by increasing our understanding of requirements for nutrients in relation to different patterns of food intake. Findings help fill the gaps of our knowledge related to nutrient requirements, bioavailability, the interrelationships of nutrients, and the nutritional value of foods consumed in the United States as they relate to these requirements. Special attention in this program area is given to the study of trace constituents of foods and their effect on human health.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: HUMAN REQUIREMENTS FOR NUTRIENTS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Arizona Tucson, AZ 85721	K. Y. Lei	86-CRCR-1-1925 8600055	\$95,000	07/01/86 06/30/89	Dietary Copper and Lipoprotein Receptor Mediated Endocytosis and Retroendocytosis
Pacific Basin Area ARS, USDA 800 Buchanan Street Albany, CA 94710	Judith R. Turnlund	85-CRCR-1-1581 8603060	\$70,000	09/15/85 09/30/87	Use of Stable Isotopes to Determine Dietary Requirements of Zn, Cu, Fe, Ca and Mg
Univ. of California Davis, CA 95616	Bo Lonnerdal	86-CRCR-1-1582 8603160	\$62,000	09/01/85 08/31/87	Manganese Absorption in Humans
Univ. of California Davis, CA 95616	Kathryn G. Dewey	86-CRCR-1-1968 8600235	\$57,596	06/01/86 05/31/87	Nutrient Intake and Growth of Breast-Fed Infants, 3-18 Months
Colorado State Univ. Fort Collins, CO 80523	Gustav R. Jansen	85-CRCR-1-1680 8602875	\$70,000	09/01/86 08/31/87	Mechanisms by which Dietary Protein and Amino Acids Control Lactation
Georgetown Univ. 37th and O Streets, NW Washington, DC 20057	Margit Hamosh	85-CRCR-1-1825 8603137	\$44,000	09/15/85 09/30/87	Milk Lipases in Delivery and Digestion of Fat in Infants: An Animal Model

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: HUMAN REQUIREMENTS FOR NUTRIENTS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Florida Gainesville, FL 32611	Jesse F. Gregory, III	86-CRCR-1-1938 8600298	\$120,000	07/01/86 06/30/88	Stable-Isotopic and Enzymatic Investigation of Folacin Bioavailability
Iowa State Univ. of Science & Technology Ames, IA 50011	Donald C. Beitz	86-CRCR-1-2185 8600390	\$80,000	09/15/86 09/30/88	Mechanism of Calcium and Vitamin D3 in Regulation of Cholesterol Homeostasis
Iowa State Univ. of Science & Technology Ames, IA 50011	Robert E. Serfass	86-CRCR-1-2082 8600347	\$115,000	09/01/86 08/31/88	Intrinsic-Extrinsic Zinc Absorption Comparisons by Plasma Mass Spectrometry
Univ. of Illinois Urbana, IL 61801	Patricia V. Johnston	86-CRCR-1-1921 8600250	\$115,000	09/01/86 08/31/88	Examination of the Dietary Need for n-3 Fatty Acids Using a Transplantable Tumor Model
Univ. of Massachusetts Amherst, MA 01003	Herbert O. Hultin	86-CRCR-1-1922 8600147	\$80,000	09/01/86 08/31/88	Loss of w-3 Fatty Acids during Storage and Processing of Fish Products
Univ. of Massachusetts Worcester, MA 01605	Susan Baker	85-CRCR-1-1909 8603051	\$45,000	09/01/86 08/31/87	Effect of Malnutrition on Barrier Function of Gastrointestinal Microvillus Membrane

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: HUMAN REQUIREMENTS FOR NUTRIENTS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
John Hopkins Univ. Charles & 34th Streets Baltimore, MD 21218	Tomas R. Guilarte	85-CRCR-1-1827 8603144	\$47,000	09/01/85 08/31/87	Maternal Vitamin B-6 Nutrition: Effects on the Dopaminergic System of Progeny
Federation of American Societies for Experimental Biology 9650 Rockville Pike Bethesda, MD 20814	James A. Olson	86-CRCR-1-1942 8600012	\$4,800	06/01/86 11/30/86	Third FASEB Summer Research Conference on Micronutrients: Vitamin A and Retinoids
Univ. of Maryland College Park, MD 20742	Phylis B. Moser	86-CRCR-1-1934 8600018	\$49,000	07/01/86 06/30/87	Vitamin B-6 Status of Vegetarian and Non-vegetarian Lactating Women and their Infants
Michigan State Univ. East Lansing, MI 48824	Pamela J. Fraker	86-CRCR-1-1923 8600110	\$100,000	07/01/86 06/30/88	Alteration of Immune Development by Gestational Zinc Deprivation
Michigan State Univ. East Lansing, MI 48824	Won O. Song	86-CRCR-1-1928 8600269	\$90,000	07/01/86 06/30/88	Indices for Assessment of Pantothenic Acid Status
Medical College of Pennsylvania 3300 Henry Ave. Philadelphia, PA 19129	Alta C. Ross	86-CRCR-1-1980 8600456	\$50,000	07/01/86 06/30/87	Vitamin A and Immunity
Univ. of Missouri Columbia, MO 65211	Dennis Gordon	86-CRCR-1-1999 8600148	\$80,000	08/01/86 07/31/88	Maillard Polymers: Synthesis and Effects on Zinc Bioavailability

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: HUMAN REQUIREMENTS FOR NUTRIENTS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Duke Univ. Durham, NC 27706	Jean L. Johnson	85-CRCR-1-1599 8602326	\$33,000	07/01/85 06/30/87	Role of Molybdenum and the Molybdenum Cofactor in Human Health and Nutrition
North Carolina State Univ. Raleigh, NC 27695-7003	Charles H. Hill	86-CRCR-1-1929 8600223	\$71,000	07/01/86 06/30/88	Studies on the Effect of Vanadium on the Ionic Balance of the Blood
Cornell Univ. Ithaca, NY 14853	John E. Kinsella	86-CRCR-1-2186 8600206	\$60,000	09/15/86 09/30/87	Determination of Optimum Dietary Intake of n6 and n3 Polyunsaturated Fatty Acids
St. Luke's-Roosevelt Inst. for Health Sciences Amsterdam Ave./114th St. New York, NY 10025	F. Xavier Pi-Sunyer	85-CRCR-1-1593 8603058	\$60,000	07/01/85 06/30/87	Chromium Absorption and Assessment
Oregon State Univ. Corvallis, OR 97331	Philip D. Whanger	86-CRCR-1-2084 8600162	\$95,000	09/01/86 08/31/88	Dietary Selenium and Selenium Accumulation in Human Blood Fractions
Oregon Health Sci. Univ. 3181 SW Sam Jackson Park Rd. Portland, OR 97201	Njeri Karanja	86-CRCR-1-1930 8600407	\$110,000	07/01/86 06/30/88	Nutrient Interactions in Blood Pressure Regulation

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: HUMAN REQUIREMENTS FOR NUTRIENTS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Pennsylvania State Univ. University Park, PA 16802	John L. Beard	86-CRCR-1-1936 8600288	\$120,000	07/01/86 06/30/88	Thermogenic Performance in Iron Deficiency Anemia
Texas Tech Univ. Lubbock, TX 74909	Barbara J. Stoecker	86-CRCR-1-1924 8600284	\$130,000	07/01/86 06/30/88	Interactions of Chromium and Ascorbate in Absorption and Metabolism
Virginia Agricultural Expt. Stn. Virginia Polytechnic Inst. & State Univ. Blacksburg, VA 24061	George E. Bunce	86-CRCR-1-1946 8600037	\$80,000	07/01/86 06/30/87	Interaction of Zinc and Vitamin B ₆ in Estrogen-Directed Gene Expression
Univ. of Wisconsin Madison, WI 53706	Norlin J. Benevenga	86-CRCR-1-1939 8600109	\$120,000	09/01/86 08/31/88	Effect of Dietary Methionine and Cystine Levels on Methionine Metabolism

TOTAL \$2,253,396

BIOTECHNOLOGY

It is widely acknowledged that biotechnological research offers direct access to new, potentially valuable high technology opportunities for agriculture and food production. Recent discoveries in molecular genetics and their successful applications show that "high technology in biology" is applicable to agriculture and food and they contribute significantly to "the molecular revolution" that is basic to many of our industries. The new biotechnological research capabilities -- particularly those that build on advances in molecular biology -- have particular advantages for agriculture. They provide a new basis for changing plant and animal productivity and performance on the basis of the directed modification of specified genes and gene systems.

This new capability offers exceptional promise, but it cannot be effective unless it is closely integrated with basic science disciplines such as biochemistry, physiology, taxonomy, ecology and key agriculture disciplines such as plant and animal breeding, agronomy, horticulture, plant pathology, and entomology. In recognizing these needs, the overall goal of the Biotechnology Program is to support research aimed at establishing a thorough understanding of fundamental biological processes in animals, plants and associated microorganisms that may provide the basic scientific knowledge needed for the development and application of the new biotechnological research capability to agriculture and food.

Three research areas are emphasized: (1) molecular biology, (2) molecular and cellular mechanisms of growth and development, and (3) genetic and molecular mechanisms controlling responses to environmental and biological stress.

In Fiscal Year 1986, nine review panels were involved in evaluating proposals submitted to the Biotechnology Program. The grants awarded in this program are listed by review panel.

The primary objective of the sub-area, plant molecular biology, is to increase our understanding of the structure, function, regulation, and expression of genes of plant and the associated microbial systems. This program area emphasizes the following categories of research: (1) identification, isolation, and characterization of genes and gene products, (2) relationships between gene structure and function, (3) regulatory mechanisms of gene expression, (4) interactions between nuclear and organellar genes, and between extrachromosomal and chromosomal genes, (5) mechanisms of gene recombination and transposition, (6) molecular basis of chromosomal replication, and (7) mechanisms of interaction with beneficial or deleterious microorganisms.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Arizona State Univ. Tempe, AZ 85287	R. A. Backhaus	86-CRCR-1-2211 8601816	\$35,000	09/15/86 09/30/87	Molecular Cloning of the Rubber Transferase Gene from Guayule
Univ. of California Berkeley, CA 94720	William C. Taylor	86-CRCR-1-2212 8601728	\$80,000	09/15/86 09/30/87	Transposon Cloning of Maize Regulatory Genes
Univ. of California Davis, CA 95616	Leslie D. Gottlieb	86-CRCR-1-2139 8601542	\$120,000	09/15/86 09/30/88	Nucleotide Sequences of Plant Genes Encoding Phosphoglucose Isomerase Isozymes
Univ. of California Davis, CA 95616	Raymond Rodriguez	86-CRCR-1-2231 8600199	\$78,319*	09/15/86 09/30/88	The Molecular Biology of the Rice Alpha-amylase Genes
Univ. of California -San Diego La Jolla, CA 92093	M. J. Chrispeels	86-CRCR-1-2131 8600201	\$120,000	09/01/86 08/31/88	Gene Expression and Protein Targeting of Phytohemagglutinin in Transformed Tobacco
Univ. of California Los Angeles, CA 90024	Robert Goldberg	86-CRCR-1-2022 8601843	\$100,000	07/01/86 06/30/87	Regulation of Soybean Seed Protein Gene Expression

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Riverside, CA 92521	Linda L. Walling	86-CRCR-1-2238 8601502	\$90,000	09/15/86 09/30/88	Developmental Regulation of Light-Harvesting Complex Genes
Stanford Univ. Stanford, CA 94305	Virginia Walbot	86-CRCR-1-2167 8600172	\$150,000	09/01/86 08/31/88	Activation of the <u>Mu</u> Family of Transposable Elements
Univ. of Florida Gainesville, FL 32611	Prem S. Chourey	86-CRCR-1-2115 8600286	\$100,000	08/15/86 08/31/88	Gene Expression Analyses on Sucrose Synthetase Genes in Maize
Iowa State Univ. of Science & Technology Ames, IA 50011	D. W. Morris	84-CRCR-1-1392 8600153	\$59,240	08/01/84 07/31/88	Transposable Elements in Mutator Activity in Maize
Univ. of Illinois Chicago, IL 60680	Lon S. Kaufman	86-CRCR-1-2228 8601660	\$100,000	09/15/86 09/30/88	Cryptochrome Regulation of Nuclear Gene Expression in <u>Pisum sativum</u>
Illinois State Univ. Normal, IL 61761	David F. Weber	86-CRCR-1-2213 8601845	\$100,000	09/15/86 09/30/89	Cytogenetic Analysis of Restriction Fragment Length Polymorphisms (RFLPs) in Maize

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Illinois Urbana, IL 61801	Raymond Zielinski	86-CRCR-1-1932 8600051	\$130,000	06/01/86 05/31/88	Structure and Expression of Plant Genes Encoding Calmodulin
Indiana Univ. Fdn. Bloomington, IN 47402	Karen Muskavitch	86-CRCR-1-2140 8601811	\$120,000	08/15/86 08/31/88	Analysis of the Self- Incompatibility Locus of <u>Oenothera organensis</u>
Kansas State Univ. Manhattan, KS 66506	C. Hedgcoth, Jr.	86-CRCR-1-2144 8601771	\$90,000	09/01/86 08/31/88	Organization and Manipulation of Wheat Storage Protein Genes
BBN Laboratories Inc. 10 Moulton St. Cambridge, MA 02238	Howard S. Bilofsky	86-CRCR-1-2235 8602202	\$10,000**	09/15/86 09/30/87	Organization and Annotation of Gene Sequences of Agricultural Importance
Michigan State Univ. East Lansing, MI 48824	John B. Ohlrogge	86-CRCR-1-2214 8603145	\$187,220	09/15/86 09/30/89	Regulation of Fatty Acid Synthesis Proteins in Soybean
Agricultural & Forestry Expt. Stn. Mississippi State Univ. P.O. Drawer ES Mississippi State, MS 39762	Dawn S. Luthe	86-CRCR-1-2147 8601683	\$100,000	09/15/86 09/30/88	Transcriptional Studies of Isolated Wheat Embryo Nuclei

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Cornell Univ. Ithaca, NY 14853	John C. Sanford	86-CRCR-1-2092 8601836	\$60,000	08/01/86 07/31/87	Delivery of DNA into Cells of Onion and Tobacco Using High- Velocity Microprojectiles
Rockefeller Univ. New York, NY 10021	Gloria M. Coruzzi	86-CRCR-1-2256 8601670	\$90,000	09/15/86 09/30/87	Plant Gene Regulation During Nitrogen Assimilation
Ohio State Univ. Res. Fdn. Columbus, OH 43212	Thomas L. Sims	86-CRCR-1-2168 8601770	\$150,000	09/01/86 08/31/89	Regulation of Self-Incompatibility Gene Expression
Medical College of Ohio C.S. 10008 Toledo, OH 43699	James H. Freisheim	86-CRCR-1-2188 8601675	\$120,000	08/15/86 08/31/88	Cloning, Expression and Mutagenesis of Soybean Seedling Dihydrofolate Reductase
Pennsylvania State Univ. University Park, PA 16802	J. C. Shannon	86-CRCR-1-2141 8601706	\$100,000	09/01/86 08/31/88	Biochemical Characterization of <u>Zea mays</u> L. Endosperm Amyloplasts and the Influence of Selected Mutants
Pennsylvania State Univ. University Park, PA 16802	Chen-Pei David Tu	86-CRCR-1-2148 8601652	\$120,000	09/01/86 08/31/88	Molecular Basis of GSH S- Transferase Mediated Atrazine Tolerance in Corn

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Rhode Island Kingston, RI 02881	John P. Mottinger	86-CRCR-1-2128 8600022	\$150,000	09/01/86 08/31/89	Molecular and Genetic Studies on Recombination Transposition, and Gene Conversion in Maize
Univ. of South Carolina Columbia, SC 29208	Anthony Huang	86-CRCR-1-2156 8601668	\$130,000	08/15/86 08/30/88	Structure of Genes Involved in Oil Synthesis in Maize
Agricultural Expt. Stn. Univ. of Tennessee Knoxville, TN 37901	B. V. Conger	86-CRCR-1-2215 8601769	\$100,000	09/01/86 08/31/89	In Vitro Culture of Cool Season Forage Grasses
Univ. of Texas Austin, TX 78712	William R. Folk	86-CRCR-1-2229 8601744	\$57,249	09/15/86 09/30/87	Organization and Expression of Soybean tRNA Genes
Virginia Polytechnic Institute & State Univ. Blacksburg, VA 24061	Karl Pedersen	86-CRCR-1-2230 8600380	\$120,000	09/15/86 09/30/89	Structure-function Relationship of Zein Genes from Corn
Washington State Univ. Pullman, WA 99164	Andris Kleinhofs	86-CRCR-1-2004 8600397	150,000	07/01/86 06/30/89	Molecular and Genetic Studies of Nitrate Reductase in Barley

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Washington State Univ. Pullman, WA 99164	Thomas W. Okita	86-CRCR-1-2132 8600260	\$100,000	09/15/86 09/30/88	Molecular and Cellular Aspects of Gliadin Gene Expression
Univ. of Washington Seattle, WA 98195	Benjamin D. Hall	86-CRCR-1-2216 8601608	\$140,000	09/15/86 09/30/88	Identification of DNA Markers for Disease and Pest Resistance in Potato
Univ. of Wisconsin Madison, WI 53706	John P. Helgeson	86-CRCR-1-2142 8601708	\$110,000	09/15/86 09/30/88	Somatic Fusion in <u>Solanum</u>
Univ. of Wisconsin Madison, WI 53706	Timothy J. Donohue	86-CRCR-1-2217 8601501	\$120,000	09/15/86 09/30/88	Regulation of Cytochrome Synthesis in Photosynthesis

TOTAL \$3,587,028

* Split Funded with Genetic Mechanisms for a total award amount of \$120,000

** Split Funded with 5 other programs for a total award amount of 49,000

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT MOLECULAR BIOLOGY-PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Berkeley, CA 94720	William C. Taylor	86-CRCR-1-2032 8600593	\$100,000	08/01/86 07/31/88	Assembly of the C4 Pathway During Leaf Development
Univ. of California La Jolla, CA 92093	Melvin Y. Okamura	86-CRCR-1-2035 8600500	\$75,000	07/15/86 07/31/88	Quinone and Herbicide Binding Site on Bacteria Reaction Centers
Univ. of Illinois Urbana, IL 61801	Collin A. Wraight	86-CRCR-1-2149 8600515	\$71,000*	09/15/86 09/30/88	Molecular Biochemistry of Herbicide Resistance
Univ. of Illinois Urbana, IL 61801	Emil M. Orozco, Jr.	86-CRCR-1-1990 8600210	\$110,000	07/01/86 06/30/88	Transcription of Plastid Protein- Coding Genes
Purdue Res. Fdn. West Lafayette, IN 47907	W. R. Widger	86-CRCR-1-1989 8600543	\$94,000	09/01/86 08/31/88	Directed Mutation Studies of the Structure-Function of the Photosynthetic Cytochrome b6
Harvard College Cambridge, MA 02138	Lawrence Bogorad	86-CRCR-1-2069 8600602	\$100,000	08/01/86 07/31/88	Regulation of Expression of Plastocyanin and Cytochrome Genes by Copper

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT MOLECULAR BIOLOGY-PHOTOSYNTHESIS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Missouri Columbia, MO 65211	Donald Miles	86-CRCR-1-2028 8600577	\$100,000	09/15/86 09/30/88	Genetic Regulation of Ferredoxin
Univ. of Missouri Columbia, MO 65211	George P. Redei	86-CRCR-1-2015 8600496	\$75,000	07/01/86 06/30/88	Mechanism of Action of a Nuclear Gene Controlling Mutation in the Plastid DNA

TOTAL \$725,000

*Split Funded with Photosynthesis for a total award amount of \$100,000

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT MOLECULAR BIOLOGY-NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
South Atlantic Area ARS, USDA P.O. Box 5677 Athens, GA 30613	Paul E. Bishop	86-CRCR-1-2070 8601275	\$100,000	08/15/86 08/31/88	Characterization of an Alternative Nitrogen Fixation System in <u>Azotobacter vinelandii</u>
Univ. of Chicago Chicago, IL 60637	Robert Haselkorn	86-CRCR-1-2100 8601229	\$140,000	08/01/86 07/31/88	Nitrogen Fixation in Bluegreen Algae (Cyanobacteria)
Michigan Technological Univ. Houghton, MI 49931	Wilbur H. Campbell	86-CRCR-1-2071 8601320	\$90,000	08/01/86 07/31/88	Regulation of Corn Nitrate Reductase: Application of Monoclonal Antibodies
New Mexico State Univ. Las Cruces, NM 88003	Peter J. Lammers	86-CRCR-1-2159 8601241	\$85,000	09/01/86 08/31/88	Nitrogen Fixation and Genomic Rearrangements in <u>Anabaena</u>
Univ. of Oklahoma Norman, OK 73019	Leonard Beevers	86-CRCR-1-2072 8600059	\$85,000	07/15/86 07/31/88	Regulation of Nitrite Reductase
Univ. of Tennessee Knoxville, TN 37996	Gary Stacey	86-CRCR-1-2120 8601184	\$75,000*	09/01/86 08/31/88	Genetic Regulation of the Nodulation Genes of <u>Bradyrhizobium japonicum</u>

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT MOLECULAR BIOLOGY-NITROGEN FIXATION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Virginia Agricultural Expt. Stn. Virginia Polytechnic Inst. & State Univ. Blacksburg, VA 24061	John L. Johnson	86-CRCR-1-2073 8601327	\$100,000	08/01/86 07/31/88	Nitrogen-Fixation (<u>nif</u>) Genes in <u>Clostridium</u>

TOTAL \$675,000

*Split Funded with Nitrogen Fixation for a total award amount of \$95,000

The objective of the animal molecular biology program is to increase our knowledge and understanding of the structure, function, regulation and expression of genomes of animal, microbial and viral origin. This includes but is not limited to: the molecular biology of genes of cellular, organellar or animal origin; gene transfer and germline integration of exogenous genes; the molecular biology of replication and gene expression of bacteria, parasites, viruses and other infectious or non-infectious agents; structural immunology and immunogenetics; molecular genetics; and molecular endocrinology. Priorities are given to those studies that will yield fundamental information which may ultimately aid in improving the biological efficiency and disease resistance in domestic animals.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-ANIMAL MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Alabama Birmingham, AL 35294	Polly Roy	86-CRCR-1-2189 8600991	\$50,000	09/01/86 08/31/87	Bluetongue Virus Morphogenesis using Recombinant DNA Technologies
Univ. of California Davis, CA 95616	Dwight C. Hirsh	86-CRCR-1-2175 8601282	\$80,000	08/15/86 08/31/88	Molecular Cloning of a Gene Encoding an Outer Membrane Protein of Pasteurella
Univ. of California Davis, CA 95616	Jeffrey L. Stott	86-CRCR-1-2199 8601262	\$180,000	09/01/86 08/31/89	Characterization and Synthesis of Bluetongue Virus Peptides Conferring Protective Immunity
Univ. of Southern California Los Angeles, CA 90089	M. M. Lai	86-CRCR-1-2041 8600987	\$4,000	08/01/86 01/31/87	The Third International Coronavirus Symposium
Zoological Society of San Diego P.O. Box 551 San Diego, CA 92112	Werner P. Heuschele	86-CRCR-1-2246 8601260	\$70,000	09/15/86 09/30/88	Molecular Biology of Malignant Catarrhal Fever Viruses
Univ. of Connecticut Storrs, CT 06268	Tsu-Ju T. Yang	86-CRCR-1-2190 8601303	\$60,000	09/01/86 08/31/88	Myeloma Cell Lines for Bovine and Porcine Monoclonal Antibody Production

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-ANIMAL MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Florida Gainesville, FL 32611	Guy H. Palmer	86-CRCR-1-2247 8601380	\$90,000	09/15/86 09/30/89	Generation of Synthetic Peptides Capable of Inducing Protection Against Bovine Anaplasmosis
Univ. of Florida Gainesville, FL 32610	L. Hutt-Fletcher	86-CRCR-1-2248 8601310	\$150,000	09/15/86 09/30/89	Genes of Malignant Catarrhal Fever Virus Coding for Protective Immunogens
Univ. of Georgia Res. Fdn. Athens, GA 30602	R. Craig Findly	86-CRCR-1-2200 8601256	\$141,000	09/01/86 08/31/89	Isolation of Ichthyophthirius Genes Eliciting Immunity in Fish
Univ. of Illinois Urbana, IL 61801	Walter L. Hurley	86-CRCR-2201 8601076	\$100,000	09/15/86 09/30/88	The Bovine Mammary Immunoglobulin G Receptor
Univ. of Kansas Medical Ctr. 39th and Rainbow Blvd. Kansas City, KS 66103	Glen Andrews	86-CRCR-1-2191 8601263	\$112,000	09/01/86 08/31/88	Structure and Expression of Chicken Metallothionein Genes
Louisiana State Univ. & Agric. & Mechanical Coll. Louisiana State Univ. Baton Rouge, LA 70803	Dennis O'Callaghan	86-CRCR-1-2257 8601204	\$150,000	09/15/86 09/31/89	Molecular Studies for Development of an Equine Herpesvirus Vaccine

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-ANIMAL MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Michigan Ann Arbor, MI 48109	Charles F. Marrs	86-CRCR-1-2232 8601640	\$202,600	09/01/86 08/31/89	Molecular Studies of the Hemolysin Gene(s) of <u>Moraxella</u> <u>bovis</u>
Northern States Area ARS, USDA 1st Floor, 220 South Second Street Minneapolis, MN 55401	Keyvan Nazerian	86-CRCR-1-2258 8601201	\$100,000	09/15/86 09/30/89	Construction of Gene Expression Vectors from Avian Poxviruses
Molecular Genetics, Inc. 10320 Bren Road East Minnetonka, MN 55343	Marc S. Collett	86-CRCR-1-2249 8601071	\$120,000	09/15/86 09/30/87	Molecular Characterization of Bovine Diarrhea Virus
East Carolina Univ. Greenville, NC 7834	Henry O. Stone, Jr.	86-CRCR-1-2192 8601419	\$124,000	09/01/86 08/31/89	Cloning of Newcastle Disease Virus Genes for Hemagglutinin and Fusion Proteins
North Carolina State Univ. Raleigh, NC 27695	D. G. Simmons	86-CRCR-1-2176 8601101	\$110,000	08/15/86 08/31/89	Toxins of <u>Bordetella avium</u> : Purification and Genetics
North Carolina State Univ. Raleigh, NC 27695	William L. Miller	86-CRCR-1-2181 8601383	\$60,000*	08/15/86 08/31/88	Follicle-Stimulating Hormone Vectors for Transgenic Studies: Evaluation <u>in Vitro</u>

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-ANIMAL MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Agricultural Expt. Stn. North Dakota State Univ. of Agriculture & Applied Science Fargo, ND 58105	Daniel L. Rock	86-CRCR-1-2218 8601353	\$100,000	09/15/86 09/30/88	Molecular Characterization of Bovine Herpesvirus Type 1 (BHV- 1) Latency-Related Genes
Case Western Reserve Univ. Cleveland, OH 44106	Alan G. Goodridge	86-CRCR-1-2182 8601244	\$221,400	08/15/86 08/31/89	Regulation of the Amount of Body Fat in Poultry
Ohio State Univ. Res. Fdn. Columbus, OH 43212	Linda Saif	86-CRCR-1-2219 8601349	\$100,000	09/15/86 09/30/88	Use of cDNA Probes for the Detection of Transmissible Gastroenteritis Virus
Ohio State Univ. Res. Fdn. Columbus, OH 43212	Douglas N. Foster	86-CRCR-1-2220 8601351	\$100,000	09/01/86 08/31/88	Structural Organization and Regulation of the Chicken Thyroid Stimulating Hormone Genes
Oregon State Univ. Corvallis, OR 97331	Alvin W. Smith	86-CRCR-1-2183 8601306	\$107,140	08/15/86 08/31/88	Molecular Biology of Bacterial Pilin Subunits
Thomas Jefferson Univ. Philadelphia, PA 19107	Timothy M. Block	86-CRCR-1-2236 8601378	\$125,000	09/01/86 08/31/88	Genes and Gene Products of Marek's Disease Virus

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-ANIMAL MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Pennsylvania Philadelphia, PA 19104	W. C. Lawrence	86-CRCR-1-2221 8601420	\$150,000	09/01/86 08/31/89	Development of Bovine Herpesvirus I as Expression Vector for Genes of other Bovine Pathogens
Texas A&M Res. Fdn. College Station, TX 77843	James E. Womack	86-CRCR-1-2202 8601309	\$100,000	09/01/86 08/31/86	Gene Mapping in Cattle by <u>In Situ</u> Hybridization of G-Banded Chromosomes
Baylor College of Medicine One Baylor Plaza Houston, TX 77030	Jeffrey M. Rosen	86-CRCR-1-2250 8601202	\$100,000	09/15/86 09/30/88	Identification of DNA Sequences Required to Target Proteins to the Mammary Gland
Utah State Univ. Logan, UT 84322	Jeffery K. Kondo	86-CRCR-1-2240 8600327	\$101,000	09/15/86 09/30/88	Transposable Elements and Gene Expression in Group N Streptococci
Utah State Univ. Logan, UT 84322-1445	Joseph K. K. Li	86-CRCR-1-2251 8601003	\$100,000	09/15/86 09/30/88	Molecular Cloning Genome Analysis and Gene Probes of Bluetongue Viruses
Washington State Univ. Pullman, WA 99164-5045	R. Wesleid	86-CRCR-1-2178 8601302	\$107,000	08/15/86 08/31/88	Molecular Biology of Larval Tapeworm Antigens

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-ANIMAL MOLECULAR BIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Washington State Univ. Pullman, WA 99164-5045	Thomas J. Inzana	86-CRCR-1-2193 8601283	\$115,000	09/01/86 08/31/88	Monoclonal Antibodies for use in the Treatment and Diagnosis of Endotoxemia
Washington State Univ. Pullman, WA 99164	Lance E. Perryman	86-CRCR-1-2203 8601421	\$110,000	09/01/86 08/31/88	Cells Transfected with Cloned EIAV Genes as Targets for Cytotoxic T Lymphocytes
Washington State Univ. Pullman, WA 99164	William C. Davis	86-CRCR-1-2241 8601382	\$80,000	09/15/86 09/30/88	Characterization of Bovine Leukocyte Differentiation Antigens with Monoclonal Antibodies
Washington State Univ. Pullman, WA 99164-5045	Lynette B. Corbeil	86-CRCR-1-2252 8601160	\$192,000	09/15/86 09/30/89	Immunity to <u>Haemophilus somnus</u> Induced Reproductive Failure
Univ. of Wisconsin Madison, WI 53706	Virginia S. Hinshaw	86-CRCR-1-2194 8601593	\$202,000	09/01/86 08/31/89	Role of Antigenic Variation in the Evolution of Virulent Avian Influenza Viruses

TOTAL \$4,014,140

*Split Funded with Animal Science-Reproductive Efficiency for a total award amount of \$120,000

Research in animal growth and development contributes to a basic understanding of potential problems related to suboptimal growth and development in animals of domestic agricultural significance. The program emphasizes molecular and cellular biological approaches in a number of research areas including but not limited to: growth hormones, growth factors and other macromolecules which regulate muscle and skeletal growth; the transfer of exogenous genes to the germline of domestic animals and their subsequent expression, mammary gland biogenesis and development; the regulation of gene expression as it relates to developmental processes; the role of hormones and immune factors in mediating immunologic and physiologic stress; and the developmental consequences of embryo transfer. Special attention is given to innovative projects of "high risk."

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-ANIMAL GROWTH & DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Auburn Univ. Auburn University, AL 36849	Dennis N. Marple	86-CRCR-1-1955 8600319	\$121,400	07/01/86 06/30/88	Altered Thermoregulatory Mechanisms as a Basis for Fescue Toxicity in Cattle
Univ. of Alabama Huntsville, AL 35899	R. B. Young	86-CRCR-1-1995 8603029	\$65,000	07/01/86 06/30/88	Molecular Mechanisms of Bovine Development
Univ. of Arizona Tucson, AZ 85721	Ronald E. Allen	86-CRCR-1-2023 8600103	\$176,500	07/01/86 06/30/88	Bovine Growth Factors Involved in Myogenic Cell Proliferation
Univ. of California Davis, CA 95616	Jeffrey L. Stott	86-CRCR-1-2098 8600137	\$60,000	08/01/86 07/31/88	Ontogeny of Bovine Lymphocyte Subpopulations
Univ. of California Riverside, CA 92521	Jolinda A. Traugh	86-CRCR-1-1956 8600072	\$149,500	06/01/86 05/31/88	Genetic Analysis of a Protein Kinase Stimulating Protein Synthesis
Colorado State Univ. Fort Collins, CO 80523	K. L. Hossner	86-CRCR-1-1943 8600177	\$75,000	07/01/86 06/30/88	Sheep Liver Binding and Degradation of Sheep Somatomedin, A Growth Regulating Hormone

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-ANIMAL GROWTH & DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Iowa State Univ. of Science & Technology Ames, IA 50011	Allen H. Trenkle	86-CRCR-1-2157 8600202	\$51,600	09/01/86 08/31/88	Growth Hormone and Somatomedin-C Relationships in Growing Cattle
Iowa State Univ. of Science & Technology Ames, IA 50011	Dr. James A. Roth	86-CRCR-1-1935 8600383	\$117,000	06/01/86 05/31/88	Cytokine Regulation of Steroid Effects on Bovine Neutrophils
Central Plains Area ARS, USDA P.O. Box 70 Ames, IA 50010	H. G. Klemcke	86-CRCR-1-1951 8600180	100,000	09/01/86 08/31/89	Cellular Mechanisms of Response and Adaptation of the Adrenal during Acute and Chronic Stressors
Univ. of Illinois Urbana, IL 61801	Keith W. Kelley	86-CRCR-1-2003 8600212	\$200,000	07/01/86 06/30/89	Endocrine Regulation of the Immune System
Kansas State Univ. Manhattan, KS 66506	Frank Blecha	86-CRCR-1-1957 8600335	\$60,000	07/01/86 06/30/88	Molecular Mechanisms Involved in Stress-induced Immune Alterations in Cattle
Tufts Univ. Boston, MA 02111	Eric W. Overstrom	86-CRCR-1-2059 8600271	\$115,100	07/01/86 06/30/88	Cellular Differentiation during Development of the Porcine Blastocyst

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-ANIMAL GROWTH & DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
BBN Laboratories Inc. 10 Moulton St. Cambridge, MA 02238	Howard S. Bilofsky	86-CRCR-1-2235 8602202	\$9,000*	09/15/86 09/30/87	Organization and Annotation of Gene Sequences of Agricultural Importance
Beltsville Area ARS, USDA, Rm. 227 Bldg. 003, BARC-West Beltsville, MD 20705	Hyun S. Lillehoj	86-CRCR-1-2099 8600140	\$92,000	08/01/86 07/31/88	Determination of the Mechanisms of Protective Intestinal Immunity against Avian Coccidiosis
Michigan State Univ. East Lansing, MI 48824	Werner G. Bergén	86-CRCR-1-1958 8600240	\$87,000	07/01/86 06/30/88	Role of Androgens on Gene Transcription in Skeletal Muscle of Pigs
Univ. of Nebraska Lincoln, NE 68588-0430	Gary L. Smith	86-CRCR-1-1948 8600170	\$136,600	07/01/86 06/30/88	Somatomedins and their Carrier Proteins in Fetal Growth and Development
Rutgers, The State Univ. of New Jersey New Brunswick, NJ 08903	Colin G. Scanes	86-CRCR-1-1959 8600396	\$123,100	07/01/86 06/30/88	Role and Control of Growth Hormone in Chickens
Research Foundation of the State Univ. of New York P.O. Box 9 Albany, NY 12201	David C. Turner	86-CRCR-1-1947 8600048	\$125,000	07/01/86 06/30/88	Myoblast Attachment to Molecules of the Extracellular Matrix

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-ANIMAL GROWTH & DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Temple Univ. School of Medicine Philadelphia, PA 19140	Edward P. Kirby	86-CRCR-1-1986 8600200	\$220,000	06/01/86 05/31/89	Control of Contact Activation in Cattle
Wistar Institute 36th & Spruce St. Philadelphia, PA 19104	Donald L. Ewert	86-CRCR-1-2239 8600108	\$65,100	09/15/86 09/30/88	B Cell Development in the Chicken
Texas A & M Res. Fdn. College Station, TX 77843	S. H. Safe	86-CRCR-1-1960 8600117	\$49,100	07/15/86 07/31/88	Gene Regulation of Glutathione and Related Activities
Univ. of Texas Medical Branch 301 University Blvd. Galveston, TX 77550	Lee-Nien L. Chan	86-CRCR-1-1996 8600485	\$127,300	07/01/86 06/30/88	Molecular Studies of Red Blood Cell Differentiation
Washington State Univ. Pullman, WA 99164	Michael V. Dodson	86-CRCR-1-1961 8600049	\$114,700	06/15/86 06/30/88	Insulin-like Growth Factor Regulation of Myogenic Satellite Cells Derived from Sheep Muscles
Univ. of Wisconsin Madison, WI 53706	Theresa M. Duello	86-CRCR-1-2085 8600067	\$100,000	08/01/86 07/31/88	Anti-idiotypic Antibodies to the GnRH Receptor

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-ANIMAL GROWTH & DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Wisconsin Madison, WI 53706	Robert D. Bremel	86-CRCR-1-2158 8600066	\$60,000	09/01/86 08/31/88	Hormonal Control of Growth and Differentiation of Bovine Mammary Tissue

TOTAL \$2,600,000

* Split Funded with 5 other programs for a total award amount of \$49,000

Biotechnology-Plant Growth and Development

The goal of this sub-program area is to support basic research designed to increase a fundamental understanding of the developmental processes in agriculturally important plants and plants associated microorganisms and to encourage the use of emerging techniques for the investigation of the developmental process that may contribute to the increased agricultural productivity. This program area places emphasis on; (1) cellular and molecular mechanisms controlling growth and developmental processes including reproduction, differentiation, and senescence, and (2) metabolic processes related to growth and development.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT GROWTH & DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Davis, CA 95616	J. Clark Lagarias	86-CRCR-1-1975 8600976	\$150,000	06/15/86 06/30/88	Biosynthesis of the Phytochrome Chromophore
Univ. of California Santa Barbara, CA 93106	Rolf Christoffersen	86-CRCR-1-1976 8600666	\$115,000	09/01/86 08/31/88	Cellulase Gene Expression during Fruit Development
Stanford Univ. Stanford, CA 94305	Paul B. Green	86-CRCR-1-2013 8600980	\$155,000	09/01/86 08/31/88	The Biophysics of Flowering
Univ. of Georgia Res. Fdn., Inc. Athens, GA 30602	John E. Wampler	86-CRCR-1-1954 8600964	\$75,000	07/01/86 06/30/88	Stimulus/Response Coupling for Phytochrome in <u>Avena sativa</u> and <u>Glycine Max</u>
Univ. of Georgia Res. Fdn., Inc. Athens, GA 30602	Alice C. Harmon	86-CRCR-1-1969 8600960	\$130,000	07/01/86 06/30/88	Calcium-Dependent Protein Phosphorylation in Plants
Univ. of Illinois Urbana, IL 61801	Donald P. Briskin	86-CRCR-1-1977 8600662	\$104,000	07/01/86 06/30/88	Structure, Mechanism and Regulation of the Plant Plasma Membrane ATPase

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT GROWTH & DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Louisiana State Univ. Baton Rouge, LA 70803-1705	Thomas Moore, Jr.	86-CRCR-1-1966 8600649	\$55,000	07/01/86 06/30/88	Synthesis of Triacylglycerol in Plants
BBN Laboratories Inc. 10 Moulton St. Cambridge, MA 02238	Howard S. Bilofsky	86-CRCR-1-2235 8602202	\$5,000*	09/15/86 09/30/87	Organization and Annotation of Gene Sequences of Agricultural Importance
Beltsville Area ARS, USDA Building 003, BARC-West/NER Beltsville, MD 20705	Eliot M. Herman	86-CRCR-1-2021 8600654	\$110,000	07/01/86 06/30/88	The Ontogeny of the Legume Oil Body
Michigan State Univ. East Lansing, MI 48824	Derek Lamport	86-CRCR-1-2014 8600673	\$85,000	08/01/86 07/31/88	Cell Wall Proteins of the Cereals
Northern States Area ARS, USDA Minneapolis, MN 54401	James D. Metzger	86-CRCR-1-1967 8600658	\$85,000	06/15/86 06/30/88	Thermoinduced Stem Growth and the Regulation of Gibberellin Metabolism in <u>Thlaspi arvense</u> L.
Rensselaer Polytechnic Institute Troy, NY 12180-3590	Carl N. McDaniel	86-CRCR-1-2053 8600687	\$85,000	09/15/86 09/30/88	Genetic Control of Floral Development

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT GROWTH & DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Case Western Reserve Univ. Cleveland, OH. 44106	Christopher Cullis	86-CRCR-1-1981 8600979	\$160,000	07/01/86 06/30/88	Environmentally Induced DNA Variation in Flax: Mechanism of Changes
Univ. of Oklahoma Norman, OK 73019	Scott D. Russell	86-CRCR-1-1978 8600969	\$91,000	07/01/86 06/30/88	Isolation and Characterization of Male and Female Gametes of the Agiosperm <u>Plumbago Zeylanica</u>
Oregon Graduate Ctr. 19600 N. W. Von Neumann Drive Beaverton, OR 97005	William L. Pengelly	86-CRCR-1-2150 8600962	\$110,000	08/15/86 08/31/88	The use of Auxin-Variant Cell Lines to Study Hormone Action
Oregon State Univ. Corvallis, OR 97331	D. W. S. Mok	86-CRCR-1-1998 8600027	\$80,000	09/15/86 09/30/88	Genetic Regulation of Cytokinin Metabolism in Food Legumes
Oregon State Univ. Corvallis, OR 97331	Donald J. Armstrong	86-CRCR-1-1988 8600296	90,000	09/15/86 09/30/88	Genetic Regulation of Hormonal Metabolism in Food Legumes
Oregon State Univ. Corvallis, OR 97331	William Proebsting	86-CRCR-1-1979 8600665	\$70,000	07/01/86 06/30/88	Genetic Regulation of Shoot Development in Peas

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-PLANT GROWTH & DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Swarthmore College Swarthmore, PA 19081	Judith G. Voet	86-CRCR-1-2197 8600965	\$65,000	08/15/86 08/31/87	Characterization of the NPA- Inhibitable Auxin Anion Carrier Protein
Univ. of Texas Austin, TX 78713	Stanley J. Roux	86-CRCR-1-2001 8600700	\$95,000	09/01/86 08/31/88	Light and Ca ²⁺ Regulation of Nuclear Enzyme Activities
Texas A&M Res. Fdn. College Station, TX 77843	Page W. Morgan	86-CRCR-1-2005 8600966	\$50,000	07/15/86 07/31/88	Ma _{R3} Gene Expression Regulates Development of Sorghum via Gibberellin Synthesis
Texas A&M Res. Fdn. College Station, TX 77843	Terry L. Thomas	86-CRCR-1-2143 8600977	\$60,000	09/15/86 09/30/87	Gene Expression Programs during Carrot Development

TOTAL \$2,025,000

* Split funded with 5 other programs for a total award amount of \$49,000

Biotechnology-Genetic and Molecular
Mechanisms Controlling Responses to
Environmental Stress in Plants

This program supports research on the various physico-chemical factors (such as heat, cold, drought, etc.) which prevent the expression of the full genetic potential of a plant. The major goals are to understand the molecular basis for the response to the various stresses and to identify which genetic systems causing these responses can be manipulated by biotechnology techniques.

The program emphasizes: the identification, transfer, and expression of genes involved in the stress response or are likely to affect performance under stress; fundamental mechanisms of the stress response including injury, tolerance and avoidance of stress at the molecular, cellular, and organismal level; mechanisms of the coordination of organismal response to stress; and laboratory and field investigations leading to an understanding of the causes, consequences, and avoidance of stress.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-RESPONSES TO ENVIRONMENTAL STRESS IN PLANTS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Davis, CA 95616	J. Dvorak	86-CRCR-1-2040 8601583	\$58,000	09/01/86 08/31/87	Gene Regulation by Salt Stress in <u>Elytrigia elongata</u> , Wheat, and their Amphiploid
Univ. of California Riverside, CA 92521	Anthony E. Hall	86-CRCR-1-2062 8601432	\$136,000	09/01/86 08/31/89	Mechanisms of Injury and Tolerance to High Temperature during Flowering
Carnegie Inst. of Washington 1530 P Street, N.W. Washington, D.C. 20005-1910	Olle E. Bjorkman	86-CRCR-1-2054 8601127	\$143,000	08/01/86 07/31/88	High Irradiance Stress under Field Conditions in Cotton
Univ. of Florida Gainesville, FL 32611	Leo G. Albrigo	86-CRCR-1-2081 8601553	\$132,000	09/01/86 08/31/89	Zinc Chelation in Citrus- Metabolic Role in a Decline Disorder
Univ. of Illinois Urbana, IL 61801	Jack M. Widholm	86-CRCR-1-2063 8601433	\$161,000	08/01/86 07/31/89	Proline in Cold Tolerance of Regenerable Maize Callus

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-RESPONSES TO ENVIRONMENTAL STRESS IN PLANTS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Purdue Res. Fdn. West Lafayette, IN 47907	Ray A. Bressan	86-CRCR-1-2064 8601632	\$165,000	09/01/86 08/31/89	The Role of a Stress Protein in Salt and Water Stress Tolerance in Plants
Kansas State Univ. Manhattan, KS 66506	C. B. Rajashekar	86-CRCR-1-2065 8601655	\$121,000	09/15/86 09/30/89	Investigation on the Role of Cell Walls in the Freezing Behavior of Plant Tissues
Northern States Area ARS, USDA Suite 100, 220 South Second Street Minneapolis, MN 55401	Mark E. Westgate	86-CRCR-1-2055 8601589	\$126,000	08/01/86 07/31/89	Physiological Basis for the Effects of Water Deficits on Plant Reproduction
Univ. of Minnesota St. Paul, MN 55106	Pen H. Li	86-CRCR-1-2056 8601451	\$91,000	08/01/86 07/31/88	Gene Expression during Cold Acclimation and ABA Treatment in Potato
New Mexico State Univ. Las Cruces, NM 88003	James L. Botsford	86-CRCR-1-2066 8601208	\$151,000	08/01/86 07/31/89	Metabolism of Glutamic Acid in <u>Rhizobium Meliloti</u>

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-RESPONSES TO ENVIRONMENTAL STRESS IN PLANTS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
State Univ. of New York P.O. Box 9 Albany, NY 12201	Daniel C. Walton	86-CRCR-1-2078 8601521	\$165,000	09/01/86 08/31/89	The Biosynthesis of Absciscic Acid in Water-Stressed Plants
Cold Spring Harbor Laboratory PO Box 100 Cold Spring Harbor, NY 11724	Andrew C. Hiatt	86-CRCR-1-2057 8600064	\$165,000	08/01/86 07/31/89	The Role of Polyamines during Stress-induced Alterations in Gene Expression
Cornell Univ. Ithaca, NY 14853	T. L. Setter	86-CRCR-1-2067 8601634	\$111,000	08/01/86 07/31/88	Influence of Water Stress on the Developmental Transition of Maize Kernels
Oregon State Univ. Corvallis, OR 97331-2911	Leslie H. Fuchigami	86-CRCR-1-2068 8601585	\$69,000	08/01/86 07/31/88	Mechanism and Role of Ethylene Induction in Plants Exposed to Freezing Stress
Gordon Research Conferences Gordon Research Center c/o Univ. of Rhode Island Kingston, RI 02881	A. Cruickshank	86-CRCR-1-2058 8601460	\$6,000	08/01/86 01/31/87	Gordon Research Conference on Temperature Stresses in Plants

TOTAL \$1,800,000

Biotechnology-Plant Response to
Biological Stress

Grants in this area support studies on the genetic and molecular mechanisms controlling plant responses to other biological agents, such as insects, nematodes, fungi, bacteria, viruses, and mycoplasma-like organisms. A major goal of this sub-program area is to understand the molecular basis for the organism's interactions with these stress agents and to identify which genetic systems causing these responses can be manipulated by techniques in biotechnology.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-RESPONSE TO BIOLOGICAL STRESS PLANT PATHOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Berkeley, CA 94720	Brian J. Staskawicz	86-CRCR-1-2086 8600299	\$18,000*	09/01/86 09/30/88	Molecular Basis of Race-Specific Avirulence in <u>Pseudomonas</u> <u>syringae</u> pv. <u>glycinea</u>
Univ. of California Berkeley, CA 94720	Steven E. Lindow	86-CRCR-1-2198 8600523	\$100,000	09/01/86 08/31/88	Regulation, Localization and Structure of Bacterial Ice Proteins
Univ. of California Davis, CA 95616	Tsune Kosuge	85-CRCR-1-1697 8602379	\$67,000	07/01/85 06/30/87	Control of Virulence in <u>Pseudomonas savastanoi</u>
Univ. of California Davis, CA 95616	John J. Harada	86-CRCR-1-2172 8601846	\$50,000	09/15/86 09/30/87	Molecular Aspects of Disease in Higher Plants
Univ. of California Riverside, CA 92521	Noel T. Keen	86-CRCR-1-2233 8601544	\$100,000	09/01/86 08/31/88	Characterization, Regulation and Involvement in Pathogenicity of Pectate Lyase Genes in <u>Erwinia</u> spp.
Salk Inst. for Biological Studies P.O. Box 85800 San Diego, CA 92138	Christopher J. Lamb	86-CRCR-1-2263 8602197	\$100,000	09/15/86 09/30/88	Molecular Genetic Dissection of the Functions of Defense Genes in Disease Resistance

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-RESPONSE TO BIOLOGICAL STRESS PLANT PATHOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Florida Gainesville, FL 32611	Dean W. Gabriel	86-CRCR-1-2234 8601776	\$100,000	09/01/86 08/31/88	Avirulence Gene Expression, Localization and Molecular Specificity
Univ. of Florida Gainesville, FL 32611	Harold C. Kistler	86-CRCR-1-2195 8601596	\$100,000	09/01/86 08/31/88	Role of Plasmid-like DNAs in Host Specialization of Plant Pathogenic Fungi
Univ. of Georgia Res. Fdn., Inc. Athens, GA 30602	Mark A. Schell	86-CRCR-1-2242 8601716	\$100,000	09/15/86 09/30/88	Role and Mechanism of Protein Excretion in Plant Diseases Caused by Pseudomonads
Univ. of Georgia Res. Fdn., Inc. Athens, GA 30602	William Timberlake	86-CRCR-1-2264 8600255	\$100,000	09/15/86 09/30/88	<u>In Vitro</u> Reconstruction of Fungal Chromosomes
Purdue Res. Fdn. West Lafayette, IN 47907	Richard M. Lister	86-CRCR-1-2244 8601643	\$100,000	09/15/86 09/30/88	Genomic Structure, Function, and Differentiation of BYDV Isolates
Purdue Res. Fdn. West Lafayette, IN 47907	Robert M. Hanau	86-CRCR-1-2243 8601779	\$100,000	09/15/86 09/30/88	Use of Genetic Transformation in Studies of <u>Colletotrichum</u> <u>Graminicola</u> Host Specificity

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-RESPONSE TO BIOLOGICAL STRESS PLANT PATHOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Kansas State Univ. Manhattan, KS 66506	J. E. Leach	85-CRCR-1-1765 8602734	\$55,000	08/15/85 08/31/87	Avirulence in the Rice/ <i>Xanthomonas campestris</i> pv. <i>oryzae</i> Interaction
Kansas State Univ. Manhattan, KS 66506	Steven A. Lommel	86-CRCR-1-2253 8601822	\$81,000**	09/15/86 09/30/88	Genetic Organization of Red Clover Necrotic Mosaic Virus
Kansas State Univ. Manhattan, KS 66506	F. F. White	86-CRCR-1-2259 8601782	\$100,000	09/15/86 09/30/88	Isolation of the Resistance Gene in Tomato to the Nematode <i>Meloidogyne incognita</i>
BBN Laboratories Inc. 10 Moulton St. Cambridge, MA 02238	Howard S. Bilofsky	86-CRCR-1-2235 8602202	\$5,000***	09/15/86 09/30/87	Organization and Annotation of Gene Sequences of Agricultural Importance
Boyce Thompson Inst. for Plant Research Cornell Univ. Tower Road Ithaca, NY 14853	Richard C. Staples	86-CRCR-1-1937 8600583	\$90,000	09/01/86 08/31/88	Identification of Appressorium Development Genes from <i>Colletotrichum lindemuthianum</i>
Cornell Univ. Ithaca, NY 14853	Peter F. Palukaitis	86-CRCR-1-1983 8600017	\$80,000	09/01/86 08/31/88	Molecular Mechanisms of Virus Replication

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-RESPONSE TO BIOLOGICAL STRESS PLANT PATHOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Ohio State Univ. Res. Fdn. Columbus, OH 43212	Berl R. Oakley	86-CRCR-1-1963 8600473	\$100,000	07/01/86 06/30/88	Molecular Analyses of Benomyl- resistant Mutants of <u>Aspergillus</u> <u>nidulans</u>
Univ. of Wisconsin Madison, WI 53706	P. J. Kaesberg	86-CRCR-1-1940 8600467	\$100,000	07/01/86 06/30/88	Genetic Information in Bromoviruses and its Relationship to Host Specificity
Univ. of Wisconsin Madison, WI 53706	Luis Sequeira	86-CRCR-1-2196 8601594	\$100,000	09/01/86 08/31/88	Mechanisms of Induction of the Hypersensitive Reaction in Potato Tissue Culture
Univ. of Wisconsin Madison, WI 53706	P. H. Williams	86-CRCR-1-2009 8600605	\$80,000	07/15/86 07/31/88	Multiple Disease Resistance in <u>Brassica campestris</u>

TOTAL \$1,826,000

* Split Funded with Soybean Research for a total award amount of \$150,000

** Split Funded with Biological Stress-Plant Pathology & Weeds for a total award amount of \$90,000

*** Split Funded with 5 other programs for a total award amount of \$49,000

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-RESPONSE TO BIOLOGICAL STRESS PLANT ENTOMOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Florida Gainesville, FL 32611	Harlan Glenn Hall	86-CRCR-1-2101 8600130	\$30,000	07/15/86 07/31/87	Identification of Honeybee Races through DNA Restriction Fragment Polymorphism
Univ. of Florida Gainesville, FL 32611	James E. Maruniak	84-CRCR-1-1431 8600275	\$30,000	07/01/84 06/30/87	Expansion of the Host Range of <u>Anticarsia gem matalis</u> Baculovirus
South Atlantic Area ARS, USDA P.O. Box 5677 Athens, GA 30613	Alfred M. Handler	86-CRCR-1-2012 8600105	\$75,000	06/15/86 06/30/88	Gene Transin Insects of Economic Importance
Iowa State Univ. Ames, IA 50011	Robert Andrews, Jr.	86-CRCR-1-2010 8600352	\$80,000	07/01/86 06/30/88	Synthesis of the Entomocidal Parasporal Crystal of <u>Bacillus</u> <u>thuringiensis</u>
Illinois State Univ. Normal, IL 61761	David W. Borst, Jr.	86-CRCR-1-1964 8600359	\$100,000	06/01/86 05/31/88	Development and Utilization of a Radioimmunoassay for Juvenile Hormone
Univ. of Kentucky Res. Fdn. Lexington, KY 40506	Thomas P. Pirone	86-CRCR-1-1965 8600377	\$90,000	06/01/86 05/31/88	Nature and Mode of Action of the Potyvirus Helper Component

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: BIOTECHNOLOGY-RESPONSE TO BIOLOGICAL STRESS PLANT ENTOMOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Louisiana State Univ. & A&M College Baton Rouge, LA 70803	Dorothy P. Pashley	86-CRCR-1-2027 8600058	\$80,000*	07/01/86 06/30/88	Characterization of Host Races or Sibling Species in Fall Armyworm
Massachusetts General Hospital Boston, MA 02114	James A. Nathanson	86-CRCR-1-2024 8600090	\$63,000	07/01/86 06/30/88	Amine Neurotransmitter Receptors as Selective Targets for Pesticide Action
Univ. of Nebraska Lincoln, NE 68588-0118	Kenneth Nickerson	86-CRCR-1-1973 8600444	\$75,000	07/01/86 06/30/88	Significance of the Sugar Residues in <u>Bacillus thuringiensis</u> Protein Toxin
Boyce Thompson Institute for Plant Research Cornell Univ. Tower Rd. Ithaca, NY 14853	H. A. Wood	86-CRCR-1-2011 8600045	\$52,000	09/01/86 08/31/88	Persistent Baculovirus Infections of Insects
Univ. of Utah Salt Lake City, UT 84112	David Wolstenholme	86-CRCR-1-1994 8600094	\$100,000	06/01/86 05/31/88	Plant Nematode Mitochondrial DNA

TOTAL \$775,000

* Split Funded with Biological Stress on Plants-Entomology & Nematology for
a total awarded amount of \$90,000

ACID PRECIPITATION

This program supports research on the effects of acid precipitation on economically important plants including trees and associated microorganisms. Specific areas encouraged are: interactive effects of acidic rain with other atmospheric pollutants; effect of excess hydrogen ions and oxides of nitrogen and sulfur on heavy metal mobilization and on other soil processes; predisposition of plants exposed to acid to secondary effects e.g. pathogens; and the mechanisms of the response to acid deposition.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: ACID PRECIPITATION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Riverside, CA 92521	Robert Musselman	85-CRCR-1-1892 8601529	\$77,770	09/15/85 09/30/87	Effects of Acidic Fog on Agricultural Crops in California
Univ. of Illinois Urbana, IL 61801	Richard E. Crang	86-CRCR-1-2050 8601475	\$112,515	09/15/86 03/31/89	Effects of Acidity on Metal Ion and Phosphate Localization in Ectomycorrhizae
Williams College Williamstown, MA 01267	David P. Dethier	86-CRCR-1-2089 8601493	\$85,690	09/01/86 08/31/87	Biologic Cycling of Al in a Northern Hardwood Forest, Massachusetts
Univ. of Missouri Columbia, MO 65211	Edgar McGinnes, Jr.	86-CRCR-1-2074 8601556	\$76,120	09/01/86 02/28/88	A Temporal Record of Pollution Influence in the Ozark Area from the Wood of Redcedar
Washington State Univ. Pullman, WA 99164-5045	James B. Harsh	86-CRCR-1-2075 8601557	\$139,267	09/01/86 08/31/89	Response of Trees to Acid- Induced Metal Release using Artificial Soil
Univ. of Wyoming Laramie, WY 82071	William K. Smith	86-CRCR-1-2061 8601588	\$135,266	08/01/86 07/31/88	Effects of Acid Mist on Needle Mortality in High Elevation Conifers

TOTAL \$626,628

ANIMAL SCIENCE

The emphasis in this research program is to improve reproductive efficiency in domestic farm animals. Research is supported in all possible problem areas: puberty, ovulation, corpus luteum formation and function, sperm physiology, insemination, fertilization, prenatal death, and poor survival of offspring. There are two sub-programs:

Brucellosis

The Brucellosis program supports research at the molecular, cellular, and genetic levels that: define the mechanisms by which Brucella abortus induces disease in cattle and persists as an infectious agent; defines the basis of the bovine immune response with B. abortus that results in protective immunity; through molecular techniques identifies and produces immunogens to stimulate long-lived protective immunity in cattle; identifies and produces antigens to differentiate among non-infected, vaccinated and B. abortus - infected cattle.

Reproductive Physiology.

This sub-program area supports innovative research in the following categories: (a) Mechanisms affecting embryo survival, endocrinological control of embryo development, mechanisms of embryo-maternal interactions, and embryo implantation; (b) gamete physiology, primarily gametogenesis including maturation processes, follicle growth, ovulation, corpus luteum formation and function and superovulation; fundamental processes of fertilization mechanisms regulating gamete survival in vivo and in vitro, and basic questions regarding gamete transport and (c) fundamental questions addressing parturition, postpartum interval to conception and neonatal survival.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL SCIENCE-REPRODUCTIVE EFFICIENCY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Northwestern Univ. Evanston, IL 60201	Andrew LaBarbera	86-CRCR-1-2103 8601023	\$200,000	09/01/86 08/31/88	Regulation of FSH Responsiveness in Porcine Granulosa Cells
Univ. of Missouri Columbia, MO 65211	Michael F. Smith	86-CRCR-1-2104 8601122	\$181,000	09/01/86 08/31/88	Uterine Mechanisms Associated with Subnormal Luteal Function in Cattle
North Carolina State Univ. Raleigh, NC 27695	William L. Miller	86-CRCR-1-2181 8601383	\$60,000*	08/15/86 08/31/88	Follicle-Stimulating Hormone Vectors for Transgenic Studies: Evaluation <u>in Vitro</u>
North Carolina State Univ. Raleigh, NC 27695	G. D. Dial	86-CRCR-1-2179 8601114	\$100,000	09/01/86 08/31/88	Hypothalamo-Hypophyseal Control of Ovarian Development in the Gilt
Agricultural Expt. Stn. Univ. of Nebraska Lincoln, NE 68583-0704	James E. Kinder	86-CRCR-1-2136 8601108	\$100,000	09/15/86 09/30/89	Hormonal Regulation of Pituitary Gonadotropin Secretion in the Bovine Female
Cornell Univ. Ithaca, NY 14853	Robert H. Foote	86-CRCR-1-2162 8601156	\$200,000	09/15/86 09/30/89	Fertilization Failure and Embryo Mortality: The Male Component

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL SCIENCE-REPRODUCTIVE EFFICIENCY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Oklahoma Agricultural Expt. Stn. Oklahoma State Univ. Stillwater, OK 74078	R. D. Geisert	86-CRCR-1-2105 8601059	\$200,000	09/01/86 08/31/89	Effects of Advanced Uterine Environment on Blastocyst Development and Survival
South Dakota State University Brookings, SD 57007	D. P. Evenson	86-CRCR-1-2170 8601126	\$160,771	09/01/86 08/31/88	Flow Cytometric Analysis of Bull Sperm Fertility Parameters
Agricultural Expt. Stn. VA Polytechnic Inst. & State Univ. Blacksburg, VA 24061	James W. Knight	86-CRCR-1-2177 8600996	\$100,000	09/01/86 08/31/88	Porcine Placental and Endometrial Steroidogenesis
West Virginia Univ. Morgantown, WV 26506	Robert A. Dailey	86-CRCR-1-2107 8601056	\$51,025	09/01/86 08/31/88	Association of Inflammatory-like Reactions in the Ovulatory Process of Gilts

TOTAL \$1,352,796

* Split Funded with Biotechnology-Animal Molecular Biology for a total awarded amount of \$120,000

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL SCIENCE-BRUCELLOSIS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Louisiana State Univ. Agricultural Center Baton Rouge, LA 70803	Frederick Enright	86-CRCR-1-2208 8601257	\$93,300	09/15/86 09/30/88	Interaction of Bovine Macrophages with <u>Brucella</u> <u>abortus</u>
BBN Laboratories Inc. 10 Moulton St. Cambridge, MA 02238	Howard S. Bilofsky	86-CRCR-1-2235 8602202	\$10,000*	09/15/86 09/30/87	Organization and Annotation of Gene Sequences of Agricultural Importance
Oklahoma State Univ. Stillwater, OK 74078	Richard Essenberg	86-CRCR-1-2209 8601136	\$147,000	09/01/86 08/31/89	Nutrient Utilization in <u>Brucella</u> <u>abortus</u> Studied by Cloning the Genes in <u>E. coli</u>
Univ. of Wisconsin Madison, WI 53706	Gary Splitter	86-CRCR-1-2210 8601020	\$200,000	09/01/86 08/31/89	T-Lymphocyte-macrophage Interactions to <u>Brucella abortus</u>

TOTAL \$450,300

* Split Funded with 5 other programs for a total awarded amount of \$49,000

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL SCIENCE-REPRODUCTIVE PHYSIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Arizona Tucson, AZ 85721	Mark E. Wise	86-CRCR-1-2123 8601106	\$198,081	09/01/86 08/31/89	Regulation of Gonadotropin Secretion during Postpartum Anestrus
Univ. of California Davis, CA 95616	Gary B. Anderson	86-CRCR-1-2152 8601065	\$215,000	09/01/86 08/31/88	Development of Lines of Undifferentiated Embryonic Stem Cells from Porcine Embryos
Univ. of California Davis, CA 95616	Robert BonDurant	86-CRCR-1-2187 8601130	\$142,400	09/15/86 09/30/88	Diagnostic and Clinical Studies on Bovine Trichomoniasis
Colorado State Univ. Fort Collins, CO 80523	H. Sawyer, Jr.	86-CRCR-1-2127 8601152	\$150,000	09/15/86 09/30/88	Hormonal Control of Follicular Growth and Development
Univ. of Florida Gainesville, FL 32611	Fuller W. Bazer	86-CRCR-1-2106 8601062	\$220,000	09/01/86 08/31/89	Porcine Conceptus-Endometrial Interactions Affecting Embryonic Survival
Iowa State Univ. of Science & Technology Ames, IA 50011	Lloyd Lee Anderson	86-CRCR-1-2130 8601123	\$134,428	09/01/86 08/31/89	Relaxin on Control of Parturition in Cattle

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL SCIENCE-REPRODUCTIVE PHYSIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Illinois Urbana, IL 61801	Janice M. Bahr	86-CRCR-1-2124 8601150	\$192,000	09/01/86 08/31/88	Endocrine Changes Associated with Molting in the Domestic Hen
Univ. of Illinois Urbana, IL 61801	Philip J. Dziuk	86-CRCR-1-2180 8601087	\$44,000	08/15/86 08/31/88	Growth Pattern of the Pig Uterus
Univ. of Missouri Columbia, MO 65211	H. A. Garverick	86-CRCR-1-2137 8601113	\$104,547	09/01/86 08/31/88	Etiology, Turnover Rate and Hormone Secretory Dynamics of Ovarian Cysts in Dairy Cattle
Agricultural & Forestry Expt. Stn. Mississippi State Univ. Mississippi State, MS 39762	Nancy M. Cox	86-CRCR-1-2254 8601189	\$40,000	09/15/86 09/30/88	Effects of Manipulating Dietary Energy and Metabolic Hormones on Pig Ovulation Rate and Litter Size
Cornell Univ. Ithaca, NY 14853	J. E. Fortune	86-CRCR-1-2125 8601171	\$250,000	09/15/86 09/30/89	Ovarian Follicular Development and Function in Cattle: Relative Roles of LH and FSH
Ohio State Univ. Res. Fdn. Columbus, OH 43212	Joy L. Pate	86-CRCR-1-2151 8601125	\$82,940	09/01/86 08/31/88	Hormonal and Immunological Aspects of Luteolysis

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL SCIENCE-REPRODUCTIVE PHYSIOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Ohio State Univ. Res. Fdn. Columbus, OH 43212	T. G. Ramsay	86-CRCR-1-2126 8601110	\$210,000	09/01/86 08/31/88	Development of Lines of Undifferentiated Embryonic Stem Cells from Porcine Embryos
Texas A&M Res. Fdn. College Station, TX 77843	D. W. Forrest	85-CRCR-1-1844 8601225	\$35,000	09/15/85 09/30/87	Endocrine Control of Bioactive Luteinizing Hormone during Sexual Maturation
Washington State Univ. Pullman, WA 99164	Thomas E. Besser	86-CRCR-1-2169 8601162	\$100,000	09/01/86 08/31/88	Increasing Neonatal Calf Survival: Exploiting a Novel Mechanism of Enteric Immunity
Univ. of Wisconsin Madison, WI 53706	Bernard Wentworth	86-CRCR-1-2255 8601057	\$25,000	09/15/86 09/30/87	Ducks Hosting Turkey Primordial Germ Cells as Surrogate Parents of Turkey Poults
West Virginia Univ. Morgantown, WV 26506	Roy L. Butcher	86-CRCR-1-2138 8601039	\$110,000	09/01/86 08/31/89	Roles of the Follicle and Oocyte in Conception Rates in Cattle

TOTAL \$2,253,396

ALCOHOL FUELS RESEARCH

This program is administered under the authority of Section 1419 of Public Law 95-113, as amended, which authorizes grants for research in areas of alcohols and industrial hydrocarbons from agricultural commodities and forest products and agricultural chemicals and other products and coal derivatives. The total amount available for this program during Fiscal Year 1986 was \$487,272.

This program supports research activities related to the physiological, microbiological, biochemical and genetic processes controlling the biological conversion of agriculturally important biomass material to alcohol fuels and industrial hydrocarbons. Studies on factors which limit efficiency of biological production of alcohol fuels and means of overcoming these limitations are also encouraged.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: ALCOHOL FUELS RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Davis, CA 95616	Michael J. Holland	86-CRCR-1-2133 8601050	\$108,000	09/01/86 08/31/88	Regulation of Pyruvate Decarboxylase Genes from Ethanol Producing Yeasts
Univ. of Florida Gainesville, FL 32611	L. O'Neal Ingram	86-CRCR-1-2134 8600984	\$107,000	09/01/86 08/31/89	Construction of Lactose-utilizing Strains of <u>Zymomonas mobilis</u>
Boston Univ. Boston, MA 02215	Eva R. Kashket	86-CRCR-1-2207 8601083	\$145,272	09/15/86 09/30/88	Physiology of Solvent Producing Clostridia
Michigan State Univ. East Lansing, MI 48824	R. U. Byerrum	86-CRCR-1-2135 8601105	\$127,000	08/15/86 08/31/88	Glycerol Production by Plants

TOTAL \$487,272

INSECT PEST SCIENCE

Before successful strategies for managing insect pests can be developed, a strong basic insect biology research effort is needed. The Insect Pest Science Program provided \$901,548 each for basic studies on boll weevil/bollworm, pine bark beetle, and gypsy moth. This program area supports research on behavioral physiology; chemical ecology; insect-host interaction; endocrinology; population dynamics; behavioral ecology; and insect pathogens, parasites and predators.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: INSECT PEST SCIENCE-BOLL WEEVIL/BOLLWORM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Riverside, CA 92521	Michael E. Adams	86-CRCR-1-2097 8601630	\$100,000	09/15/86 09/30/88	Pharmacology of Synaptic Transmission in the Cotton Bollworm, <u>Heliothis virescens</u>
South Atlantic Area ARS, USDA Athens, GA 30613	James H. Tumlinson	86-CRCR-1-2163 8601480	\$145,027	08/15/86 08/31/88	<u>Heliothis</u> and Gypsy Moth Parasitoids: Learning and Semiochemical-Induced Foraging
Central Plains Area ARS, USDA P.O. Box 70, RR #2 Ames, IA 50010	M. H. Greenstone	86-CRCR-1-2051 8601393	\$100,000	09/01/86 08/31/88	Species-specific Serological Assays for Diagnosis of <u>Heliothis</u> <u>zea</u> Parasitism
Univ. of Massachusetts Amherst, MA 01003	Ring T. Carde	86-CRCR-1-2164 8601622	\$112,521	09/15/86 09/30/88	<u>Heliothis</u> and Gypsy Moth Parasitoids: Learning and Semiochemical Induced Foraging
Univ. of Maryland College Park, MD 20742	Charles Mitter	86-CRCR-1-2113 8601624	\$137,000	09/01/86 08/31/89	Biosystematics of Heliothine Pests: Molecular and Morphological Approaches
Univ. of Texas Austin, TX 78712	Mary A. Rankin	86-CRCR-1-2102 8601537	\$100,000	09/01/86 08/31/88	Diapause and Migration in <u>Anthonomus grandis</u>

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: INSECT PEST SCIENCE-BOLL WEEVIL/BOLLWORM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Texas A & M Res. Fdn. College Station, TX 77843	S. Bradleigh Vinson	86-CRCR-1-2087 8601294	\$127,000	09/01/86 08/31/88	Hormonal Changes Associated with Host/Parasitoid Relationships
Agricultural Expt. Stn. VA Polytechnic Inst. & State Univ. Blacksburg, VA 24061	John L. Eaton	86-CRCR-1-2165 8601464	\$80,000	09/01/86 08/31/88	Relationship of Photoreception and Energy Metabolism to Cotton Bollworm Moth Locomotor Activity

TOTAL \$901,548

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: INSECT PEST SCIENCE-GYPSY MOTH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Riverside, CA 92521	Tom S. Bellows	86-CRCR-1-2173 8601505	\$41,972	08/15/86 08/31/88	New Analytical Methods for Assessing Parasitism Rates in Gypsy Moth Populations
Univ. of Connecticut Storrs, CT 06268	Norman T. Davis	86-CRCR-1-2095 8601621	\$100,000	08/01/86 07/31/88	The Functional Neuronanatomy of the Feeding System of Gypsy Moth Larvae
Univ. of Massachusetts Amherst, MA 01003	R. Van Driesche	86-CRCR-1-2171 8601579	\$45,576	08/15/86 08/31/88	New Analytical Methods for Assessing Parasitism Rates in Gypsy Moth Populations
Univ. of Massachusetts Amherst, MA 01003	David E. Leonard	86-CRCR-1-2153 8601485	\$125,000	08/15/86 08/31/88	Gypsy Moth Population Biology: Storage Proteins as Indices of Nutritive Quality
Beltsville Area ARS, USDA Beltsville, MD 20705	E. P. Masler	86-CRCR-1-2111 8601507	\$100,000	09/01/86 08/31/89	Molecular Endocrinology of Development and Reproduction in <u>Lymantria dispar</u>
Univ. of Maryland College Park, MD 20742	Pedro Barbosa	86-CRCR-1-2096 8601488	\$100,000	09/01/86 08/31/88	Parasitoid Foraging Behavior and Spatial Patterns of Parasitism in a Forest-Host Parasitoid System

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: INSECT PEST SCIENCE-GYPSY MOTH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Boyce Thompson Inst. for Plant Research Cornell Univ. Tower Road Ithaca, NY 14853	H. Alan Wood	86-CRCR-1-2154 8601486	\$100,000	09/15/86 09/30/88	Persistent LdMNPV Infections of Gypsy Moths in Nature
Cornell Univ. Ithaca, NY 14853	Wendell L. Roelofs	86-CRCR-1-2112 8601540	\$190,000	08/01/86 07/31/89	Biosynthetic Route and Enzymes for the Gypsy Moth Sex Pheromone
Pennsylvania State Univ. University Park, PA 16802	Robert A. J. Taylor	86-CRCR-1-2090 8601391	\$99,000	09/01/86 08/31/88	Factors Affecting Silk Secretion and their Effect on Gypsy Moth Larval Dispersal

TOTAL \$901,548

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: INSECT PEST SCIENCE-PINE BARK BEETLE

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Arkansas Fayetteville, AR 72701	F. M. Stephen, Jr.	85-CRCR-1-1689 8601573	\$78,456	09/15/85 09/30/88	Bark Beetle/Fungal Dynamics: Influence of Host Tree Resistance and Suitability
Southern Forest Expt. Stn. FS, USDA, U.S. Postal Service Bldg. Room T-10210 701 Loyola Ave. New Orleans, LA 70113	Donald N. Kinn	86-CRCR-1-2155 8601563	\$80,000	09/15/86 09/30/89	Pinewood Nematode: A Stress Factor Predisposing Pines to Attack by Bark Beetles
Southern Forest Expt. Stn. FS, USDA U.S. Postal Service Bldg. Rm T-10210 701 Loyola Ave. New Orleans, LA 70113	J. Robert Bridges	86-CRCR-1-2166 8601562	\$150,000	09/15/86 09/30/89	Studies of Southern Pine Beetle Dispersal using Rare Elements as Markers
Agricultural & Forestry Expt. Stn. Mississippi State Univ. P.O. Drawer ES Mississippi State, MS 39762	T. E. Nebeker	86-CRCR-1-2114 8601258	\$82,000	08/01/86 07/31/88	Bark Beetle/Host Interactions: Significance of Host Variability on Population Processes
Texas A&M Res. Fdn. College Station, TX 77843	Thomas L. Payne	86-CRCR-1-2091 8601084	\$89,548	09/01/86 08/31/88	Sensory Basis of Interspecific Olfactory Communication in Southern Pine Bark Beetle Complex

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: INSECT PEST SCIENCE-PINE BARK BEETLE

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Brigham Young Univ. Provo, UT 84602	Rex G. Cates	85-CRCR-1-1691 8601572	\$71,544	09/15/85 09/30/88	Bark Beetle/Fungal Dynamics: Influence of Host Tree Resistance and Suitability
Washington State Univ. Pullman, WA 99164-5045	Rodney B. Croteau	86-CRCR-1-2052 8601511	\$150,000	08/01/86 07/31/88	Biochemistry of Pine Resistance to Bark Beetles and their Fungal Symbionts
Univ. of Wisconsin Madison, WI 53706	Kenneth F. Raffa	86-CRCR-1-2077 8601363	\$200,000	09/01/86 08/31/89	The Role of Root Weevils and Associated Microorganisms in Predisposing Pines to Bark Beetle Attack

TOTAL \$901,548

SOYBEAN RESEARCH

The overall goal of this program area is to support long-term, basic biological research on soybeans that can generate new ideas, new knowledge, and innovative technologies which ultimately will contribute to increased productivity of the soybean crop. Interdisciplinary approaches are encouraged. This program area emphasizes research projects that are designed to: (1) enhance the fundamental understanding of physiology and biochemistry of the soybean, and (2) develop innovative genetic and breeding strategies for enhanced soybean germplasm.

COMPETITIVE RESEARCH GRANTS PROGRAM
PROGRAM AREA: SOYBEAN RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Auburn Univ. Auburn University, AL 36849	C. M. Peterson	86-CRCR-1-2020 8600967	\$103,364	09/15/86 09/30/89	Flower Abscission of Soybean: Ultrastructure and Physiology
Univ. of California Berkeley, CA 94720	Brian J. Staskawicz	86-CRCR-1-2086 8600299	\$132,000*	09/01/86 09/30/88	Molecular Basis of Race-Specific Avirulence in <u>Pseudomonas</u> <u>syringae</u> pv. <u>glycines</u>
Iowa State Univ. of Science & Technology Ames, IA 50011	Richard Shibles	86-CRCR-1-2039 8600698	\$77,000	07/15/86 07/31/88	Respiratory Characteristics and Production Efficiency in Soybean Tissues
Univ. of Illinois Urbana, IL 61801	Bruce L. Vasilas	86-CRCR-1-2088 8601182	\$70,000	09/15/86 09/30/88	N ₂ Fixation and N Supply Effects on Soybean Seed Fill Duration and Yield
BBN Laboratories Inc. 10 Moulton St. Cambridge, MA 02238	Howard S. Bilofsky	86-CRCR-1-2235 8602202	\$10,000**	09/15/86 09/30/87	Organization and Annotation of Gene Sequences of Agricultural Importance
Univ. of Wisconsin Madison, WI 53706	Dale M. Norris	84-CRCR-1-1501 8600351	\$75,000	09/15/84 09/30/88	Phenylpropanoid-Based Inducible Soybean Resistance to Insects

TOTAL \$467,364

* Split Funded with Biotechnology-Response to Biological Stress Plant Pathology for a total award amount of \$150,000

** Split Funded with 5 other programs for a total award amount of \$49,000

FOREST AND RANGELAND RENEWABLE RESOURCES PROGRAM

This is a new entry in the Competitive Research Grants Program (CRG). It was established by Congress as special funding to the U.S. Department of Agriculture Forest Service Research. However, the funds were transferred to the neutral ground of CRG so Forest Service scientists could also compete. When appropriating the funds, Congress stipulated that they were to be equally divided between harvesting, processing, and utilization research; and forest biology, including biotechnology. Based on Congressional intent, together with research needs identified by the forestry community, each half of the program developed its special areas of emphasis. This program is administered under the authority of Section 5 of P.L. 95-307, 16 U.S.C. 1644.

The Wood Utilization part focused on three areas: (1) Wood Chemistry and Biochemistry where breakthroughs have unlimited potential for expanding wood utilization. Basic questions needing attention include the principles governing enzymatic reactions affecting bioconversion and deterioration mechanisms, lignin and cellulose polymer modification, surface chemistry, bonding chemistry, and thermal reactions. (2) Physical/Mechanical Properties of Wood and Basic Processing Technology, which constitutes an area needing an improved base of scientific knowledge for development of new products and processes. This research is concentrated on

anatomical structures, physical and mechanical properties, and processing characteristics of both solid and reconstituted wood materials. (3) Improvements in the area of Structural Wood Engineering have long been hampered by reliance on traditional methods and a lack of technical data on the performance of wood under in-service conditions. The aim here is to encourage innovational approaches to the structural use of wood, and to gain better knowledge of interactions within a structure, develop improved reliability based designs, and increased understanding of basic failure mechanisms.

The Forest Biology part emphasizes two areas: (1) Genetic Structure and Function, which is aimed at utilizing variations and adaptations that exist in gene pools of existing populations. Research focus is on development of better techniques for genetic engineering, production on whole plants from tissue or cell culture, identification of valuable genes, and increased knowledge of genomes. (2) The objectives of Mechanisms of Interactions in Forest Systems are to gain a basic understanding of the forces that influence forest ecosystems, especially their development and productivity. Research is needed in this area that leads to increased basic knowledge of the mechanisms driving synergistic processes, and those involved in antagonistic relationships of forest organisms.

FOREST & RANGELAND RENEWABLE RESOURCES PROGRAM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Auburn Univ. Auburn University, AL 36849	James L. Fridley	86-FSTY-9-0168 8602712	\$127,000	09/15/86 09/30/89	Improving Engineering Design in Forestry Machinery
Auburn Univ. Auburn University, AL 36849	R. C. Tang	86-FSTY-9-0184 8602589	\$132,000	09/15/86 09/30/89	Analysis of Composite Panel Behavior Under Changing Environments
Agricultural Expt. Stn. Univ. of Arkansas Fayetteville, AR 72701	Patrick Fenn	86-FSTY-9-0197 8602725	\$51,000	09/15/86 09/30/88	Microscopy of Latency and the Host-Pathogen Interaction of a Stress-Related Pathogen of Oaks
Northern Arizona Univ. Flagstaff, AZ 86011	Michael R. Wagner	86-FSTY-9-0196 8602769	\$130,000	09/15/86 09/30/89	Mechanisms Responsible for the Effect of Ponderosa Pine Water Stress on Pine Sawflies
PSW Forest & Range Expt. Stn., FS, USDA P.O. Box 245 Berkeley, CA 94701	B. B. Kinloch, Jr.	86-FSTY-9-0191 8603044	\$81,000	09/15/86 09/30/88	Model Testing Genetic Interactions in a Forest Pathosystem: Pine/Gall Rust
PSW Forest & Range Expt. Stn., FS, USDA P.O. Box 245 Berkeley, CA 94701	D. Harry	86-FSTY-9-0190 8603048	\$97,000	09/15/86 09/30/88	Alcohol Dehydrogenase Genes in Pines

FOREST & RANGELAND RENEWABLE RESOURCES PROGRAM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Berkeley, CA 94720	David A. Dornfeld	86-FSTY-9-0164 8602746	\$60,000	09/15/86 09/30/89	Manufacturing Process Monitoring and Analysis using Acoustic Emission
Univ. of California Berkeley, CA 94720	Eugene Zavarin	86-FSTY-9-0169 8602754	\$160,000	09/15/86 07/31/89	Chemistry of the Modification of Lignocellulosics by Cold Plasma
Univ. of California Davis, CA 95616	Bruce R. Hartsough	86-FSTY-9-0198 8602893	\$110,000	09/15/86 09/30/89	Investigation of Towed Vehicles for Cable Logging of Prebunched Timber
Univ. of California Riverside, CA 92521	W. M. Jarrell	86-FSTY-9-0215 8602684	\$144,000	09/15/86 09/30/88	Ecological Adaptation of Tree Rhizobia
Colorado State Univ. Fort Collins, CO 80523	Jozsef Bodig	86-FSTY-9-0199 8602533	\$60,000	09/15/86 09/30/88	Accelerated Testing for Mechanical Joints of Wood Composites
Colorado State Univ. Fort Collins, CO 80523	M. D. Vanderbilt	86-FSTY-9-0170 8602732	\$108,000	09/15/86 09/30/88	Computer Aided Design of Light- Frame Structures

FOREST & RANGELAND RENEWABLE RESOURCES PROGRAM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Colorado State Univ. Fort Collins, CO 80523	R. M. Gutkowski	86-FSTY-9-0189 8602733	\$95,000	09/15/86 09/30/88	A Model for Impact Behavior of Structural Timbers
Univ. of Florida Gainesville, FL 32611	Jon D. Johnson	86-FSTY-9-0200 8602879	\$127,000	09/15/86 09/30/89	Stress Acclimation of Photosynthesis in Pine
Univ. of Georgia Res. Fdn., Inc. Athens, GA 30602	Lawrence A. Morris	86-FSTY-9-0223 8602843	\$150,000	09/15/86 09/30/89	Root Competition and Nutrient Uptake in Pine Plantations
Univ. of Illinois Urbana, IL 61801	J. O. Dawson	86-FSTY-9-0171 8602720	\$91,000	09/15/86 09/30/89	Factors Regulating Black Walnut Growth in Mixed Plantings with N Fixers
Univ. of Kentucky Res. Fdn. Lexington, KY 40506	B. A. Thielges	86-FSTY-9-0165 8602532	\$126,000	09/15/86 09/30/88	Genetics of Host-Pathogen Interactions in the Cottonwood- Leaf Rust System
Southern Forest Expt. Stn. FS, USDA Rm T-10210, U.S. Postal Ser. Bldg. 701 Loyola Ave. New Orleans, LA 70113	Eddie W. Price	86-FSTY-9-0201 8602679	\$109,000	09/15/86 09/30/89	Resin Distribution and Horizontal Density Effects on Wood Composite Durability

FOREST & RANGELAND RENEWABLE RESOURCES PROGRAM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Massachusetts Amherst, MA 01003	Donald L. Mader	86-FSTY-9-0202 8602902	\$80,900	09/15/86 09/30/88	Identity and Significance of Light- and Heavy-fraction Soil Organic Matter
Michigan State Univ. East Lansing, MI 48824	Indrek Wichman	86-FSTY-9-0192 8602605	\$106,000	09/15/86 09/30/89	Experimental and Theoretical Studies of Wind-Aided Flame Spread on Wood
Michigan Technological Univ. Houghton, MI 49931	A. F. Preston	86-FSTY-9-0172 8602680	\$60,000	09/15/86 09/30/87	Influence of Wood-Chemical Interactions in the Development of New Wood Preservatives
North Central Forest Expt. Stn. FS, USDA St. Paul, MN 55108	Richard E. Dickson	86-FSTY-9-0214 8602543	\$150,000	09/15/86 09/30/89	Carbon Partitioning in Northern Red Oak: A Key to Control of Early Growth
North Central Forest Expt. Stn. FS, USDA St. Paul, MN 55108	Harold A. Stewart	86-FSTY-9-0173 8602912	\$115,000	09/15/86 09/30/88	High - Temperature Wear Mechanisms of Tool Materials in Wood Machining
North Central Forest Expt. Stn. FS, USDA St. Paul, MN 55108	R. G. Buchman	86-FSTY-9-0203 8602847	\$77,000	09/15/86 09/30/88	The Impact of Self-thinning Dynamics on Stand, Stand Component, and Individual Tree Temporal Development

FOREST & RANGELAND RENEWABLE RESOURCES PROGRAM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Minnesota St. Paul, MN 55104	Roland Gertjejansen	86-FSTY-9-0182 8602701	\$77,000	09/15/86 09/30/89	Improved Utilization of Lake States Hardwoods for Structural Composite Panels
Univ. of Minnesota St. Paul, MN 55104	Simo Sarkanen	86-FSTY-9-0166 8602644	\$155,000	09/15/86 09/30/89	The Isolation and Characterization of Kraft Lignin Components
Univ. of Missouri Columbia, MO 65211	Stephen G. Pallardy	86-FSTY-9-0193 8602841	\$85,000	09/15/86 09/30/89	Mechanisms of Drought Adaptation in Seedlings of Deciduous Hardwoods
North Carolina State Univ. Raleigh, NC 27695	Irving S. Goldstein	86-FSTY-9-0174 8602531	\$90,000	09/15/86 09/30/88	Process Variables and Kinetics of Hydrolysis of Wood Cellulose by Concentrated Sulfuric Acid
North Carolina State Univ. Raleigh, NC 27695	Chen-Loung Chen	86-FSTY-9-0204 8602508	\$120,000	09/15/86 09/30/89	Chemical Modification of Technical Lignins and their Physical Properties
Univ. of New Hampshire Durham, NH 03824	Thomas Harrington	86-FSTY-9-0186 8602935	\$109,000	09/15/86 09/30/89	Biology and Taxonomic Concepts of <u>Armillaria</u> in Spruce-fir Forests

FOREST & RANGELAND RENEWABLE RESOURCES PROGRAM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Res. Fdn. of State Univ. of New York Albany, NY 12201	Robert B. Hanna	86-FSTY-9-0185 8602797	\$71,598	09/15/86 09/30/89	Cytological Aspects of Wood Formation in Douglas-Fir (<u>Pseudotsuga Menziessi</u>)
Res. Fdn. of State Univ. of New York Albany, NY 12201	David H. Griffin	86-FSTY-9-0194 8602667	\$91,000	09/15/86 09/30/88	The Mechanism of Drought Stress Enhanced Hypoxylon Canker Development in <u>Populus</u> <u>tremuloides</u>
Cornell Univ. Ithaca, NY 14853	Kenneth W. Mudge	86-FSTY-9-0216 8602764	\$82,825	09/15/86 09/30/89	The Role of Ethylene and Auxins in the Development of Ectomycorrhizal Symbiosis
Case Western Reserve Univ. Cleveland, OH 44106	Christopher Cullis	86-FSTY-9-0205 8602457	\$150,000	09/15/86 09/30/88	Characterization of the Natural Variability in <u>Pinus radiata</u> DNA
Ohio State Univ. Res. Fdn. Columbus, OH 43212	Frank W. Whitmore	86-FSTY-9-0206 8602765	\$88,100	09/15/86 09/30/88	Characterization of a Gene Product Associated with Embryogenesis in White Pine
Oregon Graduate Center 19600 N. W. Von Neumann Drive Beaverton, OR 97006	D. G. Pribnow	86-FSTY-9-0207 8602787	\$152,227	09/15/86 09/30/89	Cloning and Characterization of Ligninase Genes from <u>Phanerochaete chrysosporium</u>

FOREST & RANGELAND RENEWABLE RESOURCES PROGRAM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Oregon State Univ. Corvallis, OR 97331	Joseph J. Karchesy	86-FSTY-9-0175 8602795	\$135,000	09/15/86 09/30/89	Molecular Analysis and Design of Carbohydrate-Phenolic Based Adhesive Polymers
Oregon State Univ. Corvallis, OR 97331	Phillip Sollins	86-FSTY-9-0217 8602901	\$49,000	09/15/86 03/31/88	Species-Specific Effects of Douglas-Fir, Western Hemlock and Western Redcedar on the Nitrogen Cycle
Oregon State Univ. Corvallis, OR 97331	R. P. Griffiths	86-FSTY-9-0224 8603027	\$108,000	09/15/86 03/31/88	Organic Nitrogen and Phosphorus Recycling by Douglas-fir Ectomycorrhizal Mats
Northeast Forest Expt. Stn. FS, USDA 370 Reed Road Broomall, PA 19008	Stephen B. Horsley	86-FSTY-9-0225 8602848	\$86,000	09/15/86 09/30/89	Interspecific Interference between Hayscented Fern and Black Cherry: Lighting and Nitrogen Effects
Northeastern Forest Expt. Stn. FS, USDA 370 Reed Road Broomall, PA 19008	David R. Houston	86-FSTY-9-0183 8602560	\$81,000	09/15/86 09/30/88	Genetic Mosaics and their Relationship to Patterns of Susceptibility to Insects and Diseases
Pennsylvania State Univ. University Park, PA 16802	Kim C. Steiner	86-FSTY-9-0208 8602541	\$72,000	09/15/86 09/30/88	Competition/Tolerance Responses of Northern Red Oak to Weed- Induced Stresses

FOREST & RANGELAND RENEWABLE RESOURCES PROGRAM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Texas Austin, TX 78712	Dan L. Wheat	86-FSTY-9-0195 8602675	\$50,000	09/15/86 09/30/88	An Improved Composite Element for Analyzing Light-Frame Wood Systems above Service Load Levels
Intermountain Forest & Range Expt. Stn. FS, USDA 324 25th Street Ogden, UT 84401	Clinton E. Carlson	86-FSTY-9-0218 8602671	\$85,000	09/15/86 09/30/89	Mechanisms Affecting Success of Western Spruce Budworm on Inland Douglas-fir
Agricultural Expt. Stn. VA Polytechnic Inst. & State Univ. Blacksburg, VA 24061	D. G. I. Kingston	86-FSTY-9-0188 8602629	\$86,000	09/15/86 09/30/88	Lignan Biosynthesis and Enzymology
Agricultural Expt. Stn. Virginia Polytechnic Inst. & State Univ. Blacksburg, VA 24061	Steven A. Sinclair	86-FSTY-9-0176 8602583	\$54,000	09/15/86 09/30/88	A Cross-Sectional Study of the Adaptation of New Wood Processing Technologies
Agricultural Expt. Stn. Virginia Polytechnic Inst. & State Univ. Blacksburg, VA 24061	Thomas E. McLain	86-FSTY-9-0177 8602641	\$65,000	09/15/86 03/31/89	Uniaxial and Combined Load Capacity of Threaded Fastener-Wood Joints
Agricultural Expt. Stn. VA Polytechnic Inst. & State Univ. Blacksburg, VA 24061	S. M. Holzer	86-FSTY-9-0178 8602614	\$90,000	09/15/86 09/30/89	Analysis of Glued-Laminated Timber Space Frames and Lattice Domes

FOREST & RANGELAND RENEWABLE RESOURCES PROGRAM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Vermont & State Agricultural College Burlington, VT 05405	Melvin T. Tyree	86-FSTY-9-0226 8602529	\$160,000	09/15/86 09/30/88	Water Stress Physiology of Trees: Cavitation and Hydraulic Architecture
Washington State Univ. Pullman, WA 99164	John H. Bassman	86-FSTY-9-0209 8602930	\$30,000	09/15/86 09/30/89	Physiological Mechanisms of Defoliation-induced Compensatory Growth in <u>Populus</u>
Washington State Univ. Pullman, WA 99164	Rafik Y. Itani	86-FSTY-9-0187 8602609	\$11,000	09/15/86 03/31/89	International Conference on Timber Engineering
Univ. of Washington Seattle, WA 98195	Douglas G. Sprugel	86-FSTY-9-0220 8602883	\$150,000	09/15/86 09/30/88	Tree Branches: The Link Between Physiological Processes and Intraspecific Competition
Univ. of Washington Seattle, WA 98195	Thomas M. Hinckley	86-FSTY-9-0219 8602884	\$66,000	09/15/86 09/30/88	Nutrient Stress and Carbon Allocation
Weyerhaeuser Company Biological Sciences R & D Tacoma, WA 98477	R. A. Megraw	86-FSTY-9-0221 8603035	\$75,000	09/15/86 09/30/89	Potential for Genetic Improvement of Juvenile Wood Quality

FOREST & RANGELAND RENEWABLE RESOURCES PROGRAM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Forest Products Laboratory FS, USDA One Gifford Pinchot Drive Madison, WI 53705-2398	Rodney C. DeGroot	86-FSTY-9-0211 8602611	\$83,000	09/15/86 09/30/89	Acousto-Ultrasonics: A New Technology for Nondestructive Detection of Brown Rot
Forest Products Laboratory FS, USDA One Gifford Pinchot Drive Madison, WI 53705-2398	T. Kent Kirk	86-FSTY-9-0167 8602791	\$86,000	09/15/86 09/30/88	Extracellular Lignin-Degrading Enzyme System of <u>Phanerochaete chrysosporium</u>
Forest Products Laboratory FS, USDA One Gifford Pinchot Drive Madison, WI 53705	Ronald Wolfe	86-FSTY-9-0180 8602858	\$158,000	09/15/86 09/30/89	Reliability of Light Frame Roof Systems
Forest Products Laboratory FS, USDA One Gifford Pinchot Drive Madison, WI 53705	T. Highley	86-FSTY-9-0212 8602855	\$100,000	09/15/86 09/30/88	Biochemical Agent Involved in Depolymerization of Cellulose by Brown-Rot Fungi
Forest Products Laboratory FS, USDA One Gifford Pinchot Drive Madison, WI 53705	David W. Green	86-FSTY-9-0213 8602613	\$56,000	09/15/86 03/31/89	Characterizing the Effect of Moisture Content on the Flexural Properties of Dimension Lumber
Forest Products Laboratory FS, USDA One Gifford Pinchot Drive Madison, WI 53705	T. L. Laufenberg	86-FSTY-9-0181 8602865	\$86,000	09/15/86 09/30/88	Structural Optimization of Wood and Composite-Wood Components and Systems

FOREST & RANGELAND RENEWABLE RESOURCES PROGRAM

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Wisconsin Madison, WI 53706	K. F. Raffa	85-FSTY-9-0210 8602801	\$100,000	09/15/86 09/30/89	Host Properties Affecting Red Pine Resistance to Root Weevils and Microbial Associates
Univ. of Wisconsin Madison, WI 53706	Peter B. Reich	86-FSTY-9-0222 8602777	\$111,000	09/15/86 03/31/89	Seasonal Carbon, Water, and Nitrogen Relations in Pine and Oak Forests
Univ. of Wisconsin Madison, WI 53706	R. E. Rowlands	86-FSTY-9-0179 8602699	\$116,000	09/15/86 09/30/88	Separating Contaminants from Recycled Pulp

TOTAL \$6,167,650

SPECIAL RESEARCH GRANTS PROGRAM

The objective of this grant program is to carry out research to facilitate or expand promising breakthroughs in areas of food and agricultural sciences of importance to the Nation. Two major areas of research were funded under this program during Fiscal Year 1986:

Animal Health Research	\$5,408,340
Aquaculture Research	270,180
TOTAL	\$5,678,520

This program is administered under the authority of Section 2(c) (1) of P.L. 89-106, as amended. Eligible institutions include land-grant colleges and universities, State agricultural experiment stations, and all colleges and universities having a demonstrable capacity in food and agricultural research.

A brief description of each of the two areas of research in the Special Research Grants Program follows with a listing of research grants awarded in each for FY 1986.

Animal Health

Overall, this research is to develop and/or refine abiotic and biotic methods to suppress animal losses from infectious and noninfectious diseases and internal and external parasites. The research is directed toward clarifying infectious and noninfectious diseases and parasites and their interactive effects on animal health; and to develop practical and implementable

management systems for the producer to prevent or alleviate these causes of animal losses.

Research includes clarification of complex or unknown etiologies, development or improvement of diagnostic methodologies, clarification of disease pathogenesis and methods of transmission, studies of resistance mechanisms and resistance-enhancing factors and development of disease prevention, control or eradication technologies.

Research is centered on highest priority animal health problems of beef and dairy cattle, swine, poultry, sheep and goats, horses and aquaculture species as identified by the Animal Health Science Research Advisory Board. This includes studies on major causes of disease losses in beef and dairy cattle production such as the respiratory disease complex, reproductive diseases including brucellosis and anestrus, enteric and digestive diseases, mastitis, bluetongue, parasites and metabolic diseases. Research on swine centers on health hazards such as enteric, reproductive and respiratory diseases, and other major problems such as pseudorabies and trichinosis. Poultry disease studies include respiratory diseases, skeletal problems, enteric, neoplastic and immunologic disorders. Sheep research includes diseases such as food rot, respiratory diseases, parasites and bluetongue. Equine health research centers on respiratory, enteric and reproductive diseases and musculo-skeletal disorders. Research on diseases in aquaculture species also is included.

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Davis, CA 95616	Dwight C. Hirsh	86-CRSR-2-2858 8601908	\$60,000	09/01/86 08/31/88	Construction of a DNA Probe Specific for Avian Strains of <u>Pasteurella</u>
Univ. of California Davis, CA 95616	Hans P. Riemann	86-CRSR-2-2901 8602030	\$54,083	09/01/86 08/31/87	Direct Identification of <u>Mycobacterium paratuberculosis</u> in Cattle Feces
Univ. of California Davis, CA 95616	Laurel J. Gershwin	86-CRSR-2-2918 8601986	\$149,359	09/01/86 08/31/88	Bovine Respiratory Syncytial Virus Specific IgE: Role in Pathogenesis
Univ. of California Davis, CA 95616	M. E. Mount	86-CRSR-2-2852 8602031	\$106,000	09/01/86 08/31/88	Immunoassay Screening for the Hepatotoxic Pyrrolizidine Alkaloids in Cattle
Univ. of California Davis, CA 95616	Ronald Y. Chuang	86-CRSR-2-2805 8602121	\$149,945	08/01/86 07/31/88	Refinement of Genetic Probes for the Detection of Bluetongue Virus in Infected Animals
Colorado State Univ. Fort Collins, CO 80523	Robert P. Ellis	86-CRSR-2-2907 8601990	\$149,967	09/01/86 08/31/89	An Oligonucleotide Hybridization Approach to <u>Bacteroides nodosus</u> Pilus Typing

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Connecticut Storrs, CT 06268	Tsu-Ju Yang	86-CRSR-2-2895 8602171	\$114,356	08/15/86 08/31/88	Immunoregulatory Role of Lymphocyte Subsets in Resistance to Bovine Mastitis
Univ. of Florida Gainesville, FL 32611	Alfred F. Esser	86-CRSR-2-2908 8602059	\$149,890	09/01/86 08/31/89	Complement Mediated Defense against Respiratory Disease Complex
Univ. of Florida Gainesville, FL 32611	E. C. Greiner	86-CRSR-2-2808 8602052	\$74,750	08/01/86 07/31/88	Epidemiology of Bluetongue Virus in Central America and the Caribbean
Univ. of Georgia Res. Fdn. Athens, GA 30602	W. L. Ragland	86-CRSR-2-2853 8602133	\$60,360	09/01/86 08/31/89	Nasal and Bursal Immunization for Mycoplasma
Univ. of Georgia Res. Fdn., Inc. Athens, GA 30602	Phil D. Lukert	86-CRSR-2-2836 8602148	\$93,275	07/01/86 06/30/89	Pathogenic and Antigenic Analysis of Infectious Bursal Disease Viral Variants
Iowa State Univ. of Science & Technology Ames, IA 50011	Richard F. Ross	86-CRSR-2-2897 8601920	\$146,025	09/15/86 09/30/89	Immunogenic and Virulence Factors in Mycoplasmal Pneumonia of Swine

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Louisiana State Univ. & A&M College Baton Rouge, LA 70803	Johannes Storz	86-CRSR-2-2871 8602026	\$141,971	09/01/86 08/31/89	Resistance Factors in Coronaviral Infections of Calves
Louisiana State Univ. & A&M College Baton Rouge, LA 70803	K. L. Schnorr	86-CRSR-2-2909 8602018	\$120,450	09/01/86 08/31/89	A Genetically Engineered Vaccine for Chlamydia-induced Polyarthritits in Sheep
Louisiana State Univ. & A&M College Baton Rouge, LA 70803	M. J. Newman	86-CRSR-2-2832 8602003	\$136,334	09/15/86 09/30/89	<u>Brucella abortus</u> Vaccination and Immune Response Genes in Beef Cattle
Univ. of Maryland College Park, MD 20742	Davis B. Snyder	86-CRSR-2-2837 8602070	\$60,057	09/01/86 08/31/88	A Definition of the Potential Role of Variant Newcastle Disease Virus Isolates on Poultry Health
Michigan State Univ. East Lansing, MI 48824	Leland F. Velicer	86-CRSR-2-2870 8601899	\$75,000	09/01/86 08/31/88	Recombinant DNA Proteins in Marek's Disease: Immunosuppression and Protection
Univ. of Minnesota St. Paul, MN 55104	David G. Thawley	86-CRSR-2-2929 8601938	\$149,464	09/15/86 09/30/89	Molecular and Epidemiological Aspects of Pseudorabies Virus Latency in Swine

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Minnesota St. Paul, MN 55104	G. E. Ward	86-CRSR-2-2893 8602109	\$77,434	08/15/86 08/31/88	Study of Pathogenesis Proliferative Enteritis using DNA Probes
Univ. of Minnesota St. Paul, MN 55104	M. M. Walser	86-CRSR-2-2851 8601838	\$102,142	07/15/86 07/31/89	Metabolic Interactions of Vitamin A and D: Relevance to Tibial Dyschondroplasia
Univ. of Missouri Columbia, MO 65211	Gerald M. Buening	86-CRSR-2-2855 8602020	\$96,147	09/01/86 08/31/88	Detection of <u>Anaplasma</u> <u>marginalis</u> in Bovine Tissue by <u>in</u> <u>situ</u> Hybridization
Washington Univ. St. Louis, MO 63130	Roy Curtiss III	86-CRSR-2-2854 8602095	\$90,000	09/01/86 08/31/88	Genetic Analysis of Virulence of Avian Respiratory Bacterial Pathogens
North Carolina Agricultural Res. Serv. North Carolina State Univ. P.O. Box 7601 Raleigh, NC 27695-7601	N. J. MacLachlan	86-CRSR-2-2801 8601891	\$145,300	09/01/86 08/31/89	Pathogenesis of Bluetongue Virus Infection of Cattle
Univ. of New Hampshire Durham, NH 03824	R. G. Strout	86-CRSR-2-2838 8601897	\$74,832	09/15/86 09/30/88	Humoral and Cellular Responses to Recombinant Coccidia Antigens

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Cornell Univ. Ithaca, NY 14853	John F. Timoney	86-CRSR-2-2839 8602063	\$107,205	07/01/86 06/30/88	Identification and Artificial Synthesis of the Peptide of <u>S. equi</u> Active in Mucosal Immunity
Cornell Univ. Ithaca, NY 14853	Karel A. Schat	86-CRSR-2-2859 8602161	\$84,418	09/01/86 08/31/89	Rotavirus Infection in Intact and Immunocompromised Chickens
Ohio State Univ. Res. Fdn. Columbus, OH 43212	Kenneth W. Theil	86-CRSR-2-2892 8601894	\$44,650	09/01/86 08/31/88	Genomic Probes to Detect and Differentiate Rotavirus Serogroups Infecting Swine
Ohio State Univ. Res. Fdn. Columbus, OH 43212	Linda J. Saif	86-CRSR-2-2910 8602163	\$120,694	09/01/86 08/31/89	Serotyping of Porcine Rotaviruses using Monoclonal Antibodies
Oklahoma State Univ. Stillwater, OK 74078	Anthony W. Confer	86-CRSR-2-2880 8602017	\$147,930	08/15/86 08/31/89	Characterization of an Immunogenic Carbohydrate- Protein Subunit of <u>P. haemolytica</u>
Oregon State Univ. Corvallis, OR 97331	Bradford B. Smith	86-CRSR-2-2919 8601929	\$150,000	09/15/86 09/30/88	Mastitis-Metritis-Agalactia Syndrome: The Role of Endotoxins in Pigs

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Rhode Island Kingston, RI 02881	Pei W. Chang	86-CRSR-2-2872 8602248	\$64,028	09/15/86 09/30/87	Rapid Detection of Infectious Hematopoietic Necrosis Virus Disease in Salmonids
Agricultural Expt. Stn. South Dakota State Univ. Brookings, SD 57007	David H. Francis	86-CRSR-2-2898 8602039	\$72,243	09/15/86 09/30/89	Modified Live <u>Escherichia coli</u> Vaccine for Colibacillosis of Pigs
Texas A & M Res. Fdn. College Station, TX 77843	Ellen W. Collisson	86-CRSR-2-2911 8601975	\$148,188	09/01/86 08/31/89	Molecular Differentiation of Noncytopathic and Cytopathic Isolates of Bovine Viral Diarrhea Virus
Texas A & M Res. Fdn. College Station, TX 77843	Edwin H. Robinson	86-CRSR-2-2874 8602232	\$9,344*	09/15/86 09/30/87	Nutrient Requirement Studies with Red Swamp Crayfish
Texas A & M Res. Fdn. College Station, TX 77843	R. Smith	86-CRSR-2-2833 8602069	\$149,919	09/01/86 08/31/89	Specificity of T Lymphocytes Responding to <u>Brucella abortus</u> : A Clonal Analysis
Texas A & M Res. Fdn. College Station, TX 77843	T. A. Ficht	86-CRSR-2-2806 8602049	\$149,770	09/01/86 08/31/89	Construction of Improved <u>Brucella</u> <u>Abortus</u> Vaccine Stains via Transposon Mutagenesis

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Texas A & M Res. Fdn. College Station, TX 77843	Gerald N. Woode	86-CRSR-2-2857 8601872	\$109,998	09/01/86 08/31/89	Rotavirus Vaccination and Studies on Cross Protection between Different Serotypes
Southwest Texas State Univ. San Marcos, TX 78666	Joseph Tomasso, Jr.	86-CRSR-2-2873 8602077	\$34,795	09/01/86 08/31/87	Plasma Glutamine Concentrations as an Indicator of Ammonia Inhibition of Growth in Channel Catfish
Washington State Univ. Pullman, WA 99164	Boon P. Chew	86-CRSR-2-2862 8601854	\$82,787	08/15/86 08/31/87	Vitamin A and B-carotene Effects on Phagocyte and Lymphocyte Functions in Vitro
Washington State Univ. Pullman, WA 99164	H. D. Liggitt	86-CRSR-2-2849 8602152	\$149,431	09/01/86 08/31/88	Role of Arachidonate Metabolism in Virus-Induced Alveolar Macrophage Dysfunction
Washington State Univ. Pullman, WA 99164	L. E. Perryman	86-CRSR-2-2861 8601936	\$113,857	08/01/86 07/31/88	Protection of Calves against Cryptosporidiosis with Anti- sporozoite Antibodies
Washington State Univ. Pullman, WA 99164	R. W. Leid	86-CRSR-2-2912 8602023	\$120,187	09/01/86 08/31/88	Cloning of Protective Juvenile <u>Fasciola hepatica</u> Antigens

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Washington State Univ. Pullman, WA 99164	T. C. McGuire	86-CRSR-2-2850 8602041	\$55,045	09/01/86 08/31/88	Protection against EIA Virus Variants with a Subunit Vaccine
Washington State Univ. Pullman, WA 99164	Thomas J. Inzana	86-CRSR-2-2799 8601957	\$113,399	09/01/86 08/31/88	A Subunit Vaccine for Prevention of <u>Haemophilus somnus</u> Reproductive Disease
Washington State Univ. Pullman, WA 99164	William C. Davis	86-CRSR-2-2913 8602051	\$127,357	09/01/86 08/31/89	Genetic Resistance to Mastitis
Washington State Univ. Pullman, WA 99164	Lynette B. Corbeil	86-CRSR-2-2891 8602037	\$69,008	09/01/86 08/31/89	Mechanisms of Protection against Calfhood Colisepticemia
Univ. of Wisconsin Madison, WI 53706	Charles C. Zuprinsky	86-CRSR-2-2847 8602184	\$147,867	09/01/86 08/31/89	Bovine Leukocyte Modulation by Components of <u>P. haemolytica</u> and <u>H. somnus</u>
Univ. of Wisconsin Madison, WI 53706	Gary A. Splitter	86-CRSR-2-2848 8602169	\$39,004	09/01/86 08/31/87	Effector Cell Function against IBR Virus

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: ANIMAL HEALTH RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Wisconsin Madison, WI 53706	Gary A. Splitter	86-CRSR-2-2863 8602140	\$54,084	09/15/86 09/30/88	Application of a DNA Probe Specific for Mycobacterium Paratuberculosis
Univ. of Wisconsin Madison, WI 53706	G. J. Letchworth III	86-CRSR-2-2902 8602155	\$149,999	08/15/86 02/28/90	Heterogeneity of the Cellular Response against Bovid Herpesvirus-1 Glycoproteins
Univ. of Wisconsin Madison, WI 53706	L. R. Backstrom	86-CRSR-2-2904 8602040	\$124,392	09/01/86 08/31/89	Swine Atrophic Rhinitis: Immunochemical Probes for <u>P.</u> <u>multocida</u> Antigen and Toxin
Univ. of Wisconsin Madison, WI 53706	Ronald D. Schultz	86-CRSR-2-2905 8601934	\$91,600	09/01/86 08/31/89	Immunosuppression Associated with Vitamin E-Selenium Deficiency in Swine

TOTAL \$5,408,340

* Split Funded with Aquaculture for a total awarded amount of \$11,557

Aquaculture

The purpose of this program area is to provide and/or improve upon the scientific and technical base needed by the aquaculture industry. This industry has been expanding rapidly. Problems of nutrition, breeding, physiology, management, disease and parasite control are important and are becoming more limiting as the size of the industry and its concentration have increased.

Interest is focused on local and regional problems for which solutions will contribute to national objectives related to aquaculture production.

The specific objectives of the research are: (1) improved production efficiency through diet formulation, reproduction and breeding, and disease and parasite control; (2) improved water quality for production and control of factors affecting the quality of water discharge; and (3) increased production of freshwater species having high production potential such as catfish, trout, bait minnows, and crawfish.

SPECIAL RESEARCH GRANTS PROGRAM
PROGRAM AREA: AQUACULTURE RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of California Davis, CA 95616	Serge I. Doroshov	86-CRSR-2-2875 8602269	\$79,960	09/15/86 09/30/88	Ovarian Maturation in Domestically Raised White Sturgeon
Louisiana State Univ. & A&M College Baton Rouge, LA 70803	William R. Wolters	86-CRSR-2-2878 8602279	\$28,237	09/15/86 09/30/88	Genetic Improvement in Red Swamp Crawfish, <u>Procambarus</u> <u>clarkii</u>
Oregon State Univ. Corvallis, OR 97331	Carl B. Schreck	86-CRSR-2-2876 8602228	\$80,000	09/15/86 09/30/88	Enhancement of Hormone-induced Ovulation in Pacific Salmon
Texas A&M Res. Fdn. College Station, TX 77843	Edwin H. Robinson	86-CRSR-2-2874 8602232	\$2,213*	09/15/86 09/30/87	Nutrient Requirement Studies with Red Swamp Crayfish
Washington State Univ. Pullman, WA 99164	Gary H. Thorgaard	86-CRSR-2-2877 8602276	\$79,770	08/15/86 08/31/88	Production of Inbred Lines of Rainbow Trout by All-paternal Inheritance

TOTAL \$270,180

*Split Funded with Animal Health for the awarded amount of \$11,557

RANGELAND RESEARCH GRANTS PROGRAM

Rangeland Research grants are awarded to support basic research in certain areas of rangeland research such as (1) Management of rangelands and agricultural land as integrated systems for more efficient utilization of crops and waste products in the production of food and fiber, (2) methods of managing rangeland watersheds to maximize efficient use of water and improve water yield, water quality and water conservation to protect against onsite and offsite damage of rangeland resources from floods, erosion and other detrimental influences, and to remedy unsatisfactory and unstable rangeland conditions, and (3) revegetation and rehabilitation of rangeland including the control of undesirable species of plants.

COOPERATIVE STATE RESEARCH SERVICE
PROGRAM AREA: RANGELAND RESEARCH

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Univ. of Arizona Tucson, AZ 85721	B. A. Roundy	86-CRSR-2-2924 8602959	\$79,454	09/15/86 09/30/89	Modification of Surface Soils by Livestock to Enhance Revegetation of Southwestern Rangelands
Univ. of California Davis, CA 95616	J. W. Menke	86-CRSR-2-2922 8603014	\$77,000	09/15/86 09/30/89	Ecological Limitations to Sustained Production on Woodland and Savanna Ranges
Agricultural Expt. Stn. Texas A & M Univ. College Station, TX 77843	J. W. Stuth	86-CRSR-2-2923 8602954	\$79,615	09/15/86 09/30/88	Strategic Planning Model for Integrated Range Management Systems
Agricultural Expt. Stn. Texas A & M Univ. College Station, TX 77843	C. J. Scifres	86-CRSR-2-2925 8602965	\$79,456	09/15/86 09/30/89	Succession on Mixed Shrublands: An Ecological Basis for a Working Bionomic Model
Texas Tech Univ. Lubbock, TX 79409	D. E. Ethridge	86-CRSR-2-2926 8602994	\$62,466	09/15/86 09/30/88	Alternative Production/Marketing Systems for Southwestern Cattle Ranches
Utah State Univ. Logan, UT 84322	Douglas A. Johnson	86-CRSR-2-2921 8602996	\$77,000	09/15/86 09/30/88	Stable Isotope Composition: Potential for Screening Range Forages

SMALL BUSINESS INNOVATION RESEARCH PROGRAM

The objectives of this program are to stimulate technological innovation in the private sector, to strengthen the role of small business in meeting Federal research and development needs, to increase private sector commercialization and development efforts, and to encourage participation of small and disadvantaged firms in technological innovation.

The program emphasizes support of high-quality research and development proposals containing advanced concepts related to important agricultural problems and opportunities that could lead to significant public benefits. The areas considered in this program are broad and encompass a wide range of agricultural sciences. The subtopics include: (1) air, water and soils, (2) animal production and protection, (3) food science and nutrition, (4) forests and related resources, (5) plant production and protection, and (6) rural and community development.

In Fiscal Year 1986, USDA awarded both Phase I and Phase II grants. Phase I grants are primarily for research designed to determine technical feasibility of the proposed approach or concept. Phase II grants are awarded to those Phase I projects that have shown sufficient promise for further support. The total amount awarded in Fiscal Year 1986 was \$3,555,845.

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: AIR, WATER & SOILS

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Albers Research & Development Asso. 2626 E. Arizona Biltmore Circle Suite 23 Phoenix, AZ 85016	Walter Albers	86-SBIR-8-0113 8600907	\$45,000	09/15/86 03/31/87	Water Quality Restoration by a Novel Heat and Mass Transfer Device
Agricultural Electronics Corporation 4020 East Coronado Drive Tucson, AZ 85718	William G. Gensler	86-SBIR-8-0099 8602398 ©	\$220,000	09/15/86 09/30/88	Design, Construction and Field Evaluation of a Phytogram Network
Mickley & Associates 752 Gapter Road Boulder, CO 80303	Michael C. Mickley	86-SBIR-8-0108 8600750	\$49,999	09/15/86 03/31/87	Charged Ultrafiltration Membrane Demineralization of Brackish Waters for Irrigation
K&S Systems, Inc. 3918 148th Ave., N.E. Redmond, WA 98052	Richard L. Kege1	86-SBIR-8-0104 8600904	\$40,000	09/15/86 03/31/87	Radio Telemetry Control System for Irrigation Valves
Resource Technologies Group, Inc. 400 Mississippi Street Morgantown, WV 26506	George D. Case	86-SBIR-8-0105 8600838	\$40,095	09/15/86 03/31/87	Revegetating Chemically Pretreated Contaminated Soils

TOTAL: \$395,094

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: ANIMAL PRODUCTION AND PROTECTION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Aquatic Systems, Inc. 11125 Flintkote Ave., Suite J San Diego, CA 92121	Jon C. Van Olst	86-SBIR-8-0129 8602397	\$180,000	09/15/86 09/30/88	Control of Water Quality in Intensive Geothermal Fish Culture
U.S. Embryo Technologies, Inc. 8 Laurel Road Ellington, CT 06029	Roy W. Homan	86-SBIR-8-0110 8600713	\$49,860	09/15/86 03/31/87	A Method for the Rapid Freezing and Viability Assessment of Bovine Embryos
International Resources Group, Ltd. 1015 18th Street, NW, Suite 802 Washington, DC 20036	Robert D. Kirmse	86-SBIR-8-0118 8600721	\$18,652	09/15/86 03/31/87	Domestication of <u>Leucaena</u> for Fodder in South Texas
Embrex, Inc. 401 Oberlin Road, Suite 205 Raleigh, NC 27605	J. Paul Thaxton	86-SBIR-8-0101 8600798	\$49,300	09/15/86 03/31/87	Automatic Egg Injection Machine

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: ANIMAL PRODUCTION & PROTECTION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Prime-Color, Inc. 27 Harvard Rd. Cranford, NJ 07016	William Thornton	86-SBIR-8-0115 8602416	\$150,000	09/15/86 09/30/88	Lamplight Designed Specifically to Ease USDA Meat Inspection
Bionique Laboratories, Inc. Bloomingdale Rd. Saranac Lake, NY 12983	Steven J. Geary	86-SBIR-8-0120 8602401	\$150,198	09/15/86 09/30/88	Development of a DNA Probe for the Rapid Detection of <u>Mycoplasma gallisepticum</u>
Agricultural Identification Systems, Inc. P.O. Box 951 Cookeville, TN 38503- 0951	Charles Rhea, Jr.	86-SBIR-8-0116 8600908	\$49,000	09/15/86 03/31/87	Design and Construct a System to Measure Individual Animal Water Consumption
Lee Scientific, Inc. 4426 South Century Drive Salt Lake City, UT 84123	Douglas W. Later	86-SBIR-8-0130 8602406	\$175,000	09/15/86 09/30/88	Supercritical Fluid Extraction and Analysis of Residues in Meats

TOTAL: \$822,010

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: FOOD SCIENCE & NUTRITION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
MicroGeneSys, Inc. 400 Frontage Road West Haven, CT 06516	John D. Kneil	86-SBIR-8-0091 8600811	\$50,000	09/15/86 03/31/87	The use of a Granulosis Virus for the Control of Plodia Interpunctella
Universal Sensors, Inc. P.O. Box 736 New Orleans, LA 70148	Glenn J. Lubrano	86-SBIR-8-0096 8602417	\$218,822	09/15/86 09/30/88	Rapid, Novel Methods for Determining Total Protein, Protein Quality, and Sucrose
Ohmicron Corporation 108 West Franklin Ave. Pennington, NJ 08534	Mark K. Malmros	86-SBIR-8-0117 8600805	\$50,000	09/15/86 03/31/87	A New Rapid Test for Salmonella Detection using Liposome-entrapped Molecules
JP Laboratories, Inc. 26 Howard St. Piscataway, NJ 08854	G. N. Patel	86-SBIR-8-0109 8600812	\$49,932	09/15/86 03/31/87	An Ideal Device for Monitoring Residual Shelf-life of Perishables

TOTAL: \$368,754

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: FORESTS & RELATED RESOURCES

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Foster-Miller, Inc. 350 Second Ave. Waltham, MA 02254	Arnis Mangolds	86-SBIR-8-0127 8600784	\$46,452	09/15/86 03/31/87	Prediction of Rock Anchor Capacities by Up-Hole Seismic Velocity Techniques
Renewable Technologies, Inc. P.O. Box 4113 Butte, MT 59702	Joan D. Combie	86-SBIR-8-0093 8600728	\$47,000	09/01/86 02/28/87	Solid State Culture of Mold to Produce Biological Pesticides Against Gypsy Moth
Power Alcohol, Inc. 316 Stanley Ave. Hasbrouck Heights, NJ 07604	Richard T. Nagle	86-SBIR-8-0123 8600870	\$47,000	09/15/86 03/31/87	Controlled Production of Lignins during Catalytic Conversion of Cellulose
National Gypsy Moth Management Group, Inc. R. D. #1, Box 17040 Landisburg, PA 17040	Mark Ticehurst	86-SBIR-8-0098 8602408	\$144,000	09/15/86 09/30/88	Parasitoid Manipulation toward IPM of the Gypsy Moth
Roland E. Kreibich Consulting Service 4201 South 344th St. Auburn, WA 98001	Roland E. Kreibich	86-SBIR-8-0126 8600774	\$16,000	09/15/86 03/31/87	Use of Bark Tannins in End- jointing Adhesives for Wood

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: FORESTS & RELATED RESOURCES

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
AMINEX Company P.O. Box 4174 Federal Way, WA 98063- 4174	R. D. Arsenault	86-SBIR-8-0132 8602399	\$200,000	09/15/86 09/30/88	Stress Wave Analysis of Wood Piles Related to Ultimate Compressive Strength

TOTAL: \$500,452

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: PLANT PRODUCTION & PROTECTION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Plant Genetics, Inc. 1930 Fifth St. Davis, CA 95616	John Kao	86-SBIR-8-0095 8600719	\$50,000	09/15/86 03/31/87	A Toxin-Directed Approach to Select Lettuce Resistant to Corky Root Rot
Plant Genetics, Inc. 1930 Fifth Street Davis, CA 95616	David A. Stuart	86-SBIR-8-0106 8600821	\$25,000	09/15/86 03/31/87	Automation of Plant Micropropagation
Plant Genetics, Inc. 1930 Fifth Street Davis, CA 95616	M. K. Redenbaugh	86-SBIR-8-0094 8602411	\$250,000	09/15/86 09/30/88	Artificial Seeds: Encapsulation of Somatic Embryos
BIOSIS 1057 East Meadow Circle Palo Alto, CA 94303	Milton J. Friedman	86-SBIR-8-0121 8600715	\$25,000	09/15/86 03/31/87	Mass Production in Liquid Culture of Insect-killing Nematodes
BIOSIS 1057 East Meadow Circle Palo Alto, CA 94303	Irene Popiel	86-SBIR-8-0122 8600740	\$25,000	09/15/86 03/31/87	Desiccation of Entomogenous Nematodes for Long-term Mass Storage
MicroGeneSys, Inc. 400 Frontage Road West Haven, CT 06516	Mark A. Cochran	86-SBIR-8-0092 8600743	\$50,000	09/15/86 03/31/87	Expression of Foreign Genes in Whole Insects Using Recombinant Baculovirus

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: PLANT PRODUCTION & PROTECTION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
International Resources Group, Ltd. 1015 18th Street, NW, Suite 802 Washington, DC 20036	David Deardorff	86-SBIR-8-0119 8600720	\$31,348	09/15/86 03/31/87	Breeding Improved Hybrid Cultivars of <u>Leucaena</u> for the International Seed Trade
Citrex Technologies, Inc. 728 NW 8th Ave. Gainesville, FL 32602	John D. Cox	86-SBIR-8-0090 8602407	\$200,000	09/15/86 09/30/88	The Use of X-rays to Disinfest Grapefruit of Carib Fly within the Packinghouse
Aquaculture Concepts 73-1125 Alihilani Place Kailua-Kona, HI 96740	Steven A. Katase	86-SBIR-8-0114 8600804	\$48,485	09/15/86 03/31/87	Utilization of Innovative Aquaculture Techniques in the Production of Superior Quality Nori
Terronics Development Corporation RR2, Box 450 Elwood, IN 46036	Eduardo Escallon	86-SBIR-8-0107 8600877	\$50,000	09/15/86 03/31/87	Efficient Electrostatic Spray Nozzle for Applying Translocatable Herbicides
Martek Corporation 9115 Guilford Road Columbia, MD 21046	Scott E. Bingham	86-SBIR-8-0112 8600820	\$48,795	09/15/86 03/31/87	Selection of Herbicide Tolerance Genes for Plant Improvement

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: PLANT PRODUCTION & PROTECTION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Maricultura, Inc. P.O. Drawer 565 Wrightsville Beach, NC 28480	Karen L. Hicks	86-SBIR-8-0131 8600944	\$50,000	09/15/86 03/31/87	A New Agricultural Crop for Coastal AreasThe On-land Cultivation of High-valve Marine Algae
Empire Chestnut Company 3276 Empire Road, SW Carrollton, OH 44615	Gregory Miller	86-SBIR-8-0125 8600900	\$40,510	09/15/86 03/31/87	Facilitated Harvesting of Chestnuts
Miller's Machine and Metal Works 336 N. 6th Street Hwy. 12 Prosser, WA 99350	Franklin Miller	86-SBIR-8-0111 8600842	\$35,436	09/15/86 03/31/87	Novel Automation for Increased Productivity and Reduced Costs in Hop Production

TOTAL: \$929,574

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: RURAL & COMMUNITY DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
Solid Fuel Energy Corporation P.O. Box 930 Clarksville, AR 72830	Bill R. Wittner	86-SBIR-8-0100 8600762	\$42,750	09/15/86 03/31/87	Feasibility of Operating a Rural Regional Biofuel Energy System
ELRA Group, Inc. 725 Greenwich St. Suite 300 San Francisco, CA 94133	Gerhard Hanneman	86-SBIR-8-0128 8602412	\$156,375	09/01/86 08/31/88	Rural Telecommunications Infrastructure Planning and Economic Development
Carolina Agro-Tech Corporation P.O. Box 1362 Asheville, NC 28802	Toby J. Farris	86-SBIR-8-0124 8602415	\$191,126	09/15/86 03/31/88	Inoculation Techniques for Forest Mushroom (<u>L. edodes</u>) Production
Southern Oregon Herb Gatherers' Assoc., Inc. 1305 Vista Drive Grants Pass, OR 97527	Richard A. Miller	86-SBIR-8-0102 8600849	\$50,000	09/15/86 03/31/87	A Processing Facility for Botanical Alternatives as Cash-Crops

SMALL BUSINESS INNOVATION RESEARCH PROGRAM
PROGRAM AREA: RURAL & COMMUNITY DEVELOPMENT

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	TITLE
T. J. Enterprises Box 21 Buffalo, SD 57720	Tom Johnson	86-SBIR-8-0103 8600948	\$50,000	09/15/86 03/31/87	Herb Production as an Alternative Cash Crop
Applied Science Associates, Inc. Route 1 Fairfield, VA 24435	Walter E. Tolles	86-SBIR-8-0097 8600736	\$49,710	09/15/86 03/31/87	Sweet Sorghum for a Piedmont Ethanol Industry

TOTAL: \$539,961

FOOD AND AGRICULTURAL SCIENCES NATIONAL NEEDS GRADUATE
FELLOWSHIPS GRANT PROGRAM

This program was initiated because of increasing concern about growing shortages of trained professionals in the food and agricultural sciences. The objective of the program is to encourage outstanding students (U.S. citizens) to pursue and complete a graduate degree in an area of the food and agricultural sciences for which there is a national need for the development of scientific expertise. The Fiscal Year 1986 program consisted of grants to colleges and universities with superior graduate teaching and research programs in the targeted areas of the food and agricultural sciences. Fellowships were awarded in the following areas in Fiscal Year 1986 as renewals to those institutions receiving 1984 awards.

Agricultural Engineering	\$ 623,781
Biotechnology	922,138
Food and Agricultural Marketing	598,130
Food Science/Human Nutrition	622,391
	<u>\$2,766,440</u>

This program is administered under the authority of Section 1417(a) (3) (B) of P.L. 95-113, as amended (7 U.S.C. 3103). Eligible institutions include all U.S. colleges and universities which confer a graduate degree in an area of the food and agricultural sciences targeted for national needs fellowships.

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: AGRICULTURAL ENGINEERING

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Colorado State Univ. Fort Collins, CO 80523	David McWhorter	84-GRAD-9-0009 8603068	\$58,112	09/15/84 09/14/89	Doctoral 5
Univ. of Florida Gainesville, FL 32611	J. Wayne Mishoe	84-GRAD-9-0041 8603111	\$44,103	09/15/84 09/14/89	Doctoral 4
Univ. of Illinois Urbana, IL 61801	William L. George	84-GRAD-9-0043 8603090	\$66,155	09/15/84 09/14/89	Doctoral 6*
Iowa State Univ. of Science & Technology Ames, IA 50011	T. A. Austin	84-GRAD-9-0057 8603097	\$110,258	09/15/84 09/14/89	Doctoral 10
Purdue Univ. West Lafayette, IN 47907	Edwin J. Monke	84-GRAD-9-0028 8603079	\$46,557	09/15/84 09/14/89	Doctoral 4
Univ. of Maryland College Park, MD 20742	Fred Wheaton	84-GRAD-9-0005 8603065	\$55,129	09/15/84 09/14/89	Doctoral 5

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: AGRICULTURAL ENGINEERING

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
North Carolina State Univ. Raleigh, NC 27695-7003	R. W. Skaggs	84-GRAD-9-0027 8603105	\$44,103	09/15/84 09/14/89	Doctoral 4
Univ. of Nebraska Lincoln, NE 68588-0430	William Splinter	84-GRAD-9-0065 8603108	\$67,054	09/15/84 09/14/89	Doctoral 6
Oklahoma State Univ. Stillwater, OK 74078	David R. Thompson	84-GRAD-9-0001 8603062	\$66,155	09/15/84 09/14/89	Doctoral 6
Clemson Univ. Clemson, SC 29631	Richard O. Hegg	84-GRAD-9-0066 8603101	\$11,026	09/15/84 09/14/89	Doctoral 1
Texas A&M Univ. College Station, TX 77843	Edward A. Hiler	84-GRAD-9-0040 8603088	\$55,129	09/15/84 09/14/89	Doctoral 5

TOTAL: \$623,781

* This includes 4 Doctoral's in the Food & Agricultural Marketing National Needs Area.

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: BIOTECHNOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Univ. of California Berkeley, CA 94720	Robert Ornduff	84-GRAD-9-0015 8603072	\$55,129	09/15/84 09/14/89	Doctoral 5
Univ. of California Los Angeles, CA 90024	J. P. Thornber	84-GRAD-9-0046 8603104	\$45,251	09/15/84 09/14/89	Doctoral 4
Univ. of California Riverside, CA 92521	John V. Leary	84-GRAD-9-0035 8603084	\$66,155	09/15/84 09/14/89	Doctoral 6
Stanford Univ. Stanford, CA 94305	Harold A. Mooney	84-GRAD-9-0048 8603093	\$57,830	09/15/84 09/14/89	Doctoral 5
Colorado State Univ. Fort Collins, CO 80523	Gordon Niswender	84-GRAD-9-0008 8603067	\$51,280	09/15/84 09/14/89	Doctoral 4
Univ. of Iowa Iowa City, IA 52242	John E. Butler	84-GRAD-9-0024 8603112	\$68,917	09/15/84 09/14/89	Doctoral 6
Univ. of Chicago Chicago, IL 60637	L. J. Mets	84-GRAD-9-0049 8603094	\$60,280	09/15/84 09/14/89	Doctoral 5

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: BIOTECHNOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Univ. of Illinois Urbana, IL 61801	J. A. Shaddock	84-GRAD-9-0062 8603100	\$55,129	09/15/84 09/14/89	Doctoral 5
Purdue Univ. West Lafayette, IN 47907	Bill R. Baumgardt	84-GRAD-9-0053 8603096	\$66,155	09/15/84 09/14/89	Doctoral 6
Massachusetts Institute of Technology Cambridge, MA 02139	Marcus Karel	86-GRAD-9-0018 8603074	\$33,077	09/15/84 09/14/89	Doctoral 5
Michigan State Univ. East Lansing, MI 48824- 1224	Kenneth D. Nadler	84-GRAD-9-0030 8603080	\$46,288	09/15/84 09/14/89	Doctoral 4
Univ. of Minnesota St. Paul, MN 55108	Burle Gengenbach	84-GRAD-9-0013 8603070	\$44,103	09/15/84 09/14/89	Doctoral 4

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: BIOTECHNOLOGY

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Univ. of Missouri Columbia, MO 65211	Douglas D. Randall	84-GRAD-9-0033 8603082	\$90,350	09/15/84 09/14/89	Doctoral 8
Univ. of Missouri Columbia, MO 65211	John N. Berg	84-GRAD-9-0020 8603076	\$33,077	09/15/84 09/14/89	Doctoral 3
Cornell Univ. Ithaca, NY 14853	Robert Turgeon	84-GRAD-9-0039 8603087	\$71,936	09/15/84 09/14/89	Doctoral 6
Texas A&M Univ. College Station, TX 77843	Thomas O. Baldwin	84-GRAD-9-0058 8603098	\$77,181	09/15/84 09/14/89	Doctoral 7

TOTAL: \$922,138

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: FOOD & AGRICULTURAL MARKETING

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Auburn Univ. Auburn University, AL 36849	William E. Hardy	84-GRAD-9-0042 8603089	\$22,052	09/15/84 09/14/89	Doctoral 2
Univ. of California Davis, CA 95616	Warren E. Johnston	84-GRAD-9-0044 8603091	\$44,103	09/15/84 09/14/89	Doctoral 4
Univ. of California Berkeley, CA 94720	Sherman Robinson	84-GRAD-9-0023 8603078	\$44,103	09/15/84 09/14/89	Doctoral 4
Univ. of California Berkeley, CA 94720	Joe R. McBride	84-GRAD-9-0016 8603073	\$33,077	09/15/84 09/14/89	Doctoral 3
Univ. of Maryland College Park, MD 20742	Rachel Dardis	84-GRAD-9-0050 8603095	\$46,842	09/15/84 09/14/89	Doctoral 4
Michigan State Univ. East Lansing, MI 48824- 1039	H. M. Riley	84-GRAD-9-0032 8603081	\$33,077	09/15/84 09/14/89	Doctoral 3

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: FOOD & AGRICULTURAL MARKETING

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Univ. of Minnesota St. Paul, MN 55108	Jerome W. Hammond	84-GRAD-9-0012 8603069	\$55,129	09/15/84 09/14/89	Doctoral 3
North Carolina State Univ. Raleigh, NC 27695	R. K. Perrin	84-GRAD-9-0026 8603102	\$55,129	09/15/84 09/14/89	Doctoral 5
Ohio State Univ. Res. Foundation Columbus, OH 43212	Joseph Havlicek	84-GRAD-9-0022 8603077	\$33,077	09/15/84 09/14/89	Doctoral 3
Oklahoma State Univ. Stillwater, OK 74078	Daniel S. Tilley	84-GRAD-9-0002 8603063	\$55,129	09/15/84 09/14/89	Doctoral 5
Univ. of Rhode Island Kingston, RI 02881	Thomas F. Weaver	84-GRAD-9-0045 8603110	\$33,077	09/15/84 09/14/89	Doctoral 3
Texas Tech Univ. Lubbock, TX 79409	Robert C. Albin	84-GRAD-9-0014 8603071	\$33,077	09/15/84 09/14/89	Doctoral 3

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: FOOD & AGRICULTURAL MARKETING

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Washington State Univ. Pullman, WA 99164	LeRoy Rogers	84-GRAD-9-0037 8603085	\$44,103	09/15/84 09/14/89	Doctoral 4
Univ. of Wisconsin Madison, WI 53706	Edward V. Jesse	84-GRAD-9-0004 8603064	\$66,155	09/15/84 09/14/89	Doctoral 6

TOTAL: \$598,130

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: FOOD SCIENCE/HUMAN NUTRITION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Univ. of California Davis, CA 95616	R. B. Rucker	84-GRAD-9-0047 8603092	\$89,219	09/15/84 09/14/89	Doctoral 8
Univ. of Southern California Los Angeles, CA 90033	Samuel P. Bessman	84-GRAD-9-0060 8603107	\$50,115	09/15/84 09/14/89	Doctoral 3
Univ. of Connecticut Storrs, CT 06268	K. L. Knox	84-GRAD-9-0059 8603109	\$55,129	09/15/84 09/14/89	Doctoral 5
Univ. of Florida Gainesville, FL 32611	J. S. Shonkwiler	84-GRAD-9-0038 8603086	\$88,207	09/15/84 09/14/89	Doctoral 8*
Univ. of Georgia Athens, GA 30602	Carolyn Berdanier	84-GRAD-9-0061 8603099	\$46,382	09/15/84 09/14/89	Doctoral 4
Kansas State Univ. Manhattan, KS 66506	D. Y.C. Fung	84-GRAD-9-0034 8603083	\$66,838	09/15/84 09/14/89	Doctoral 6

GRADUATE FELLOWSHIP PROGRAM
PROGRAM AREA: FOOD SCIENCE/HUMAN NUTRITION

GRANTS AWARDED FOR FISCAL YEAR 1986

ORGANIZATION	PRINCIPAL INVESTIGATOR	GRANT NUMBER PROPOSAL NUMBER	AMOUNT	AGREEMENT PERIOD FROM TO	FELLOWSHIPS SUPPORTED
Univ. of Massachusetts Amherst, MA 01003	R. G. Brown	84-GRAD-9-0036 8603061	\$55,129	09/15/84 09/14/89	Doctoral 5
Tufts Univ. Medford, MA 02155	Stanley Gershoff	84-GRAD-9-0017 8603103	\$66,367	09/15/84 09/14/89	Doctoral 6
Michigan State Univ. East Lansing, MI 48824- 1039	Thayne R. Dutson	84-GRAD-9-0031 8603106	\$22,052	09/15/84 09/14/89	Doctoral 2
Mississippi State Univ. Mississippi State, MS 39762	Gale R. Ammerman	84-GRAD-9-0006 8603066	\$11,026	09/15/84 09/14/89	Doctoral 1
Cornell Univ. Ithaca, NY 14853	M. C. Nesheim	84-GRAD-9-0019 8603075	\$71,927	09/15/84 09/14/89	Doctoral 6

TOTAL: \$622,391

*This includes 4 Doctoral's in the Food & Agricultural Marketing National Needs area.

SCIENTISTS WHO SERVED ON USDA/CSRS PEER REVIEW PANELS FOR FISCAL YEAR 1986

Scientists from government, universities, and industry served on USDA/CSRS peer review panels this past year. Each panel was put together to fit the expertise needed for that specific granting area. The scientists involved are listed below alphabetically within their respective States.

ALABAMA

Cindy Brunner
Auburn University

Ruen C. Tang
Auburn University

Ronald Young
University of Alabama

ARIZONA

Robert E. Blankenship
Arizona State University

Darrell E. Goll
University of Arizona

Thomas J. McCoy
Univ. of Arizona

James O'Leary
University of Arizona

ARKANSAS

Frederick M. Stephen
University of Arkansas

CALIFORNIA

Donald G. Arganbright
University of California, Berkeley

Thomas C. Baker
University of California, Riverside

Michael L. Bruss
University of California, Davis

Bob B. Buchanan
University of California, Berkeley

Jan Dvorak
University of California, Davis

Frances duPont
ARS-USDA

J. Daniel Hare
University of California, Riverside

Werner P. Heuschele
Zoological Society of San Diego

Dwight C. Hirsh
University of California, Davis

CALIFORNIA-continued

Stephen H. Howell
University of California, San Diego

Wesley M. Jarrell
University of California, Riverside

Russell L. Jones
University of California, Berkeley

Harry K. Kaya
University of California, Davis

Janet C. King
University of California, Berkeley

Bo Lonnerdal
University of California, Davis

Robert S. Loomis
University of California, Davis

Carole Meredith
University of California, Davis

Edward S. Mocarski
Stanford University

CALIFORNIA-continued

Donald J. Nevins
University of California, Davis

Ronald Sederoff
Forest Service-USDA

George H. Stabenfeldt
University of California, Davis

Katherine Steinback
Advanced Genetic Sciences

William Thompson
Carnegie Inst. of Washington

Judith R. Turnlund
ARS-USDA

Dan B. Walker
University of California, Los Angeles

COLORADO

Rupert P. Amann
Colorado State University

J. C. DeMartini
Colorado State University

Leonard Pearson
Colorado State University

Patrick J. Pellicane
Colorado State University

Glenn R. Schmidt
Colorado State University

COLORADO-continued

Frederick A. W. Smith
Colorado State University

Lee E. Sommers
Colorado State University

CONNECTICUT

David Benson
University of Connecticut

Louis van der Heide
University of Connecticut

Dennis L. Knudson
Yale University

Kirvin L. Knox
University of Connecticut

DISTRICT OF COLUMBIA

Richard Neal
Agency for International Development

FLORIDA

Robert J. Ferl
University of Florida

Jesse F. Gregory III
University of Florida

Edward M. Hoffman
University of Florida

FLORIDA-continued

Lonnie O'Neal Ingram
University of Florida

Alfred M. Merritt
University of Florida

Charles P. Patrick Reid
University of Florida

Robert A. Schmidt
University of Florida

Thomas R. Sinclair
University of Florida

William H. Outlaw, Jr.
Florida State University

GEORGIA

Charles W. Berisford
University of Georgia

Benjamin G. Brackett
University of Georgia

Glenn A. Galau
University of Georgia

L. Wayne Haines
International Paper

Louis W. Schierman
University of Georgia

GEORGIA-continued

Harry E. Sommer
University of Georgia

HAWAII

Charles W. Weems
University of Hawaii at Manoa

IDAHO

Norman L. Gates
University of Idaho

ILLINOIS

May R. Berenbaum
University of Illinois

Jeffrey O. Dawson
University of Illinois

Keith W. Kelley
University of Illinois

Frank Marcus
University of Health Science

John A. Shaddock
University of Illinois

Edward W. Voss
University of Illinois

William C. Wagner
University of Illinois

ILLINOIS-continued

John C. Whitmarsh
University of Illinois

INDIANA

Daniel Cassens
Purdue University

Peter E. Dunn
Purdue University

Stanton B. Gelvin
Purdue University

Donald P. Gustafson
Purdue University

P. Michael Hasegawa
Purdue University

Larry F. Huggins
Purdue University

Michael O. Hunt
Purdue University

P. V. Malven
Purdue University

IOWA

Lloyd L. Anderson
Iowa State University

Lawrence H. Arp
Iowa State University

IOWA-continued

Anthony Cavalieri
Pioneer Hybrid International

Howard D. Lehmkuhl
National Animal Disease Center

Harley Moon
National Animal Disease Center

Donald S. Robertson
Iowa State University

Richard Ross
Iowa State University

Cecil R. Stewart
Iowa State University

Carol Warner
Iowa State University

KANSAS

Duane Davis
Kansas State University

KENTUCKY

Lorraine E. Garkovich
University of Kentucky

Louis Shain
University of Kentucky

LOUISIANA

Robert Romaine
Louisiana State University

Johannes Storz
Louisiana State University

MAINE

Thomas J. Corcoran
University of Maine

Michael S. Greenwood
University of Maine

MARYLAND

Joel M. Dalrymple
U.S. Army Medical Research Inst.

Ronald Fayer
ARS-USDA

Albert J. Guidry
ARS-ARS

Howard D. Guthrie
ARS-USDA

Maris G. Hartmanis
National Institute of Health

Colonel Harold Lupton
U.S. Army Medical Center

Warren W. Marquardt
University of Maryland

MARYLAND-continued

Caird E. Rexroad, Jr.
ARS-USDA

Dinah Singer
National Cancer Institute

Steve Vonderfecht
Johns Hopkins Hospital

MASSACHUSETTS

Frank Cannon
Biotechnica International

Ring T. Carde
University of Massachusetts

Roy G. Van Driesche
University of Massachusetts

John R. Rosenau
University of Massachusetts

Norman E. Good
Michigan State University

David F. Karnosky
Michigan Tech University

John Ohlrogge
Michigan State University

Dale R. Romsos
Michigan State University

Otto Suchsland
Michigan State University

MICHIGAN-continued

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